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"INDIAN GARDENING & PLANTING."

A WEEKLY ILLUSTRATED JOURNAL.

DEVOTED TO GARDENING & PLANTING,

Including Tea, Coffee, Indigo, Economic Products, Agriculture, etc.

[EDITED BY H. ST. JOHN JACKSON, F.L.S., F.R.H. S.]

Reviser of Firminger's *Manual of Gardening for India.*

"INDIAN GARDENING AND PLANTING" has now entered upon its Sixth Volume, and as a medium for the interchange of ideas on horticulture, agriculture, and planting matters, it has become a recognised authority. Since the beginning of 1900 its scope and usefulness has been extended by the addition of a PLANTING and AGRICULTURAL SECTION. It is now illustrated weekly, while a special "Illustrated Page" has been added, giving illustrations of the latest developments in tea and other machinery. Its circulation has gone up by "leaps and bounds."

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OFFICE : No. 5-1, COUNCIL HOUSE STREET, CALCUTTA.

THE

ANNUAL REPORT

OF THE

Agricultural & Horticultural Society of India.

1899.

The President's Report.

The Council have the honour to submit a brief Report on the working of the Society during the year 1899, together with the Secretary's Report.

The following changes in the constitution took place during the year:—The Hon'ble Mr. W. B. Oldham, I.C.S., C.I.E., resigned the office of President on the 10th May, and was succeeded by Mr. H. C. Eggar, who was unanimously elected President at the meeting held on 14th June. Among the Vice-Presidents, Mr. M. C. Turner resigned on his departure to England and was succeeded by Mr. W. D. Cruickshank.

An old member of Council, Mr. J. A. Anderson, resigned owing to ill health and was succeeded by Mr. G. Girard; on Mr. W. H. Miles resigning he was succeeded by Mr. J. M. G. Prophit; Mr. F. G. Clarke was elected in place of Mr. H. C. Eggar; Mr. J. Davenport succeeded Mr. M. Finucane, I.C.S., C.S.I., and the Hon'ble Prince Mahomed Bukhtyar Shah, C.I.E., was elected in place of Mr. J. Sinclair.

On the 31st December 1899 the list of office-holders stood as follows :—

President.—Mr. H. C. Eggar.

Vice-Presidents.—Raja Peary Mohun Mukerjee, C.S.I., His Grace Archbishop Goethals, Mr. E. J. King, and Mr. W. D. Cruickshank.

Council.—Babu Protab Chundra Ghosa, Mr. W. Graham, Babu Joy Gobind Law, C.I.E., Major D. Prain, I.M.S., Rai Prosono Coomar Banerjee, Bahadur, Mr. F. A. Slack, I.C.S., Mr. G. Girard, Mr. J. M. G. Prophit, Mr. F. G. Clarke, Mr. J. Davenport, and the Hon'ble Prince Mahomed Bukhtyar Shah, C.I.E.

Ex-Officio.—The Revenue Secretary to the Government of Bengal.

The Director, Department of Land Records and Agriculture, Bengal.

Secretary.—Mr. P. Lancaster.

The number of new members added to the list (71) is larger than in the past three years. The loss by death (5)* is smaller than previously registered, among these the Society has lost its oldest member and most liberal supporter in the person of the late Mr. W. Stalkartt. The number of resignations (13) is also less than previously noted, while the number of names removed for non-payment and lengthened absence from the country (19) is the same as reported last year. The net result is *an increase* of 34 members against an increase of 16 in 1898.

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* W. Stalkartt, C. B. Garrett, Don Ramon de la Sagra, H. Bental, and Nawab Sayad Wilayat Ali Khan.

The distribution of members as they now stand may be referred to the following classified list:—

Classification.	In the previous 79 years.	In 1899.	Actual Total at end of 1899.
Honorary Members	53	0	17
Associate „	9	0	4
Corresponding „	28	0	10
Civilians	890	2	35
Merchants	830	1	43
Agriculturists	1,410	5	254
Military Officers	782	2	7
Medical	321	1	14
Asiatics	650	37	123
Clergy	54	0	3
Law	167	1	6
Police, Engineers, &c. ...	538	22	101
TOTAL ...	5,732	71	617

The Accounts.

At the close of 1899, the receipts of the Society from all sources amounted to Rs. 46,376-10-0 against Rs. 40,109-15-3 in the preceding year, which includes the annual Government payment.

The disbursements totalled Rs. 41,216-14-2 against Rs. 38,306-7-1 in 1898. The arrears of subscription have been reduced from Rs. 1,960-10-9 to Rs. 1,045-13-3.

The following is a brief review of the present financial position of the Society:—

The loan of Rs. 12,000 raised in 1889 to pay off various accumulated seed bills has to date remained unpaid, though the Council had every reason to hope that it would have been closed, together with arrears of interest, during the past year by the transfer of the Metcalfe Hall to Government, but this matter unfortunately still hangs fire.

The Seed account stands at Rs. 11,927-9-8 against Rs. 11,180-13-2 in 1898, this sum includes payments for 1898 and 1899 to Messrs. D. Landreth & Sons, R. Buist and Co., Haage & Schmidt, Dammann & Co., Law, Somners and Co., R. Cheeseman, Veitch & Sons Ld., Vilmorin, Andrieux & Co., and Messrs. Sutton & Sons for 1898, and Customs Duty, hence the increase over last year's figure. A slight reduction was made in the value of seeds distributed last season and it is expected that this will ere long enable the Society to equalize the difference between income and expenditure.

The Establishment account, Rs. 7,849-11-9 is in excess of the triennial average, owing to the addition of a Clerk and grant of a pension to the late Accountant. The Library account exhibits an increase of Rs. 17-2 in excess of the estimate, this sum having been spent in the purchase of various pamphlets.

The Advertisement account has risen from Rs. 13 to Rs. 76-12-0 owing to costs of advertisements in connection with Meetings held regarding the transfer of Metcalfe Hall, the Stationery account also shows an increase of Rs. 14-2-6, and the Printing account of Rs. 52-6-6 for the same reason. The Freight account is Rs. 138 under the estimate. In the Museum account there is a reduction of Rs. 35 owing to the rental of a room to the Indian Tea Brokers' Association.

Under Metcalfe Hall account is included the amount paid for Taxes, &c., Rs. 646-14-0 against Rs. 616-6-0 in 1899, and Rs. 457-7-0 against Rs. 1,553 in 1899 for repairs.

In the Flower Show account the amount disbursed was Rs. 316 less than in the former year in spite of the award of extra prizes.

The Petty Charges account exhibits an increase of Rs. 91, chiefly due to increase of postage and clearing charges.

Under Law charges appears an item of Rs. 100 in connection with an attempt to raise a fresh loan to pay off the existing mortgage.

In the Garden account the amount Rs. 11,169-8-8 is Rs. 186 less than shown last year.

In the Plant account Rs. 800-14-8 appears against an average of Rs. 1,690, This account the Council have determined upon increasing during the coming year ; and importing a much larger number of plants.

On the Receipts side the Subscription account shows an average collection, and in the Seed account is exhibited an average sale. In the Printing account only Rs. 6-14 appear as sale of Proceedings and Journals. The Freight account exhibits an average collection, the same being the case in Petty Charges account.

Under Rent account the receipts exceed the triennial average by Rs. 926 owing to the rental of a room to the Indian Tea Brokers' Association for a period of 6 months.

Advertisement account shows an increase of Rs. 240 over last year's receipts, and the Flower Show account Rs. 463. Under Garden account the receipts exceeded average sales by Rs. 3,800.

Under Liabilities the sum owing to seedsmen for seeds supplied in 1899, *viz.*, Rs. 5,464-8, is Rs. 2,400 less than in 1898. The remaining liabilities, excluding the loan of Rs. 12,000, but including interest on the same not drawn by the mortgagee since October, 1897, Rs. 1,890, amounts to about Rs. 679 above last year's balance.

The total liabilities amount to Rs. 20,709-13-6 against Rs. 22,421-1-3 in 1898.

Under Assets, the Cash balance Rs. 8,095-1-7 is nearly Rs. 6,000 higher than in the past three years. The outstandings Rs. 2,696-4-6, though in excess of the previous year's, are likely to be realized to a great extent during the coming month, as payments are advised.

In the Memorandum the funds of the Society appear as Rs. 23,557-15-9 sunk in the erection of Metcalfe Hall, Rs. 23,907-6-0 in landed property and buildings at Alipur, and Rs. 3,144-8-6 in $3\frac{1}{2}$ per cent. Government Promissory Notes, including interest to 31st December, 1899. The value of stock, &c., at the Gardens and furniture, books, fittings, &c., at Metcalfe Hall are not included.

The Staff.

The Council desire once again to express their entire satisfaction with the work done by the Secretary, Mr. Lancaster, and his assistant at the Gardens, Mr. Gisseliere. Both officers have worked with undiminished zeal and skill.

Metcalfe Hall.

Repairs to the building were completed during the hot weather. The balance of the moiety of cost of repairs, devolving on the Society, Rs. 457-7-0 has been paid. In terms of a Council resolution dated the 24th March the large hall was rented to the Tea Brokers' Association for 6 months, *viz.*, from June to November.

References.

The number of references from members and non-members, Municipal, Government and other offices in this country and abroad, is in excess of the number noted last year, *viz.*—

Agriculture	...	1078	against	942	in	1898	and	783 in 1897.
Horticulture	...	1971	,,	1738	,,	,,	1511	,, ,,
Economic	...	413	,,	397	,,	,,	296	,, ,,

The subjects chiefly dealt with were, Fibres, Fodders, Grain, Manures, Rubber, &c. A large quantity of seeds and plants, chiefly Fibres, Rubbers and Cereals, were distributed.

The Library is frequently referred to for information, but the samples and models in the Society's Museum have attracted little attention during the past year.

In 1899, 204 botanical specimens were received for identification, of this number many were submitted to Major D. Prain, I.M.S., Superintendent of the Royal Botanic Garden, to whom the Council tender the hearty thanks of the Society.

Experiments.

Owing to the very unfavourable weather experienced during the rains and failure of winter showers there is little to record in the experimental section. The Aermotor proved a great boon during hot weather, but owing to the fall of the breeze in the winter months little water is pumped between October and March.

Aid received.

The Council again desire to acknowledge the very valuable help rendered the Society during the past year in the conveyance of plants and seeds by Messrs. Mackinnon, Mackenzie & Co., Messrs. Finlay, Muir & Co., and Messrs. Turner, Morrison & Co., also to the numerous friends and correspondents in India, and various parts of the world, for liberal contributions of plants and seeds.

The Annual Flower Show.

The Annual Flower Show was held on the Maidan, opposite Lindsay Street, on the 17th and 18th February. The exhibits in the flower and foliage sections were good, but the Council regret to record the absence of competition in

many classes, indeed the exhibits in these classes appear to become fewer each succeeding year, and it is a matter for consideration whether the Flower Shows should be continued in future. The Society is put to considerable expense in promoting these exhibitions, and loses for one week the services of its Secretary, whose entire time during that period is taken up with purely Flower Show matters.

In the Vegetable Section all exhibits shewed a marked improvement, those in competition for special prizes being very superior.

The Annual Prize offered by the late Maharajah of Darbhanga ceased with his death, and the usual perfect display of vegetables, flowers and fruits sent down from the Darbhanga Gardens was greatly missed.

There were 65 Special prizes offered for competition, including His Excellency the Viceroy's Medal and a Silver Vase presented by His Honor the Lieutenant-Governor of Bengal.

The Garden.

The number of plants distributed and exchanged during 1899 (48,914) is larger than sent out in the previous year (48,472).

Arrangements for better and more extensive propagation of plants has proceeded rapidly, and the Council trust that old members will endeavour to enlist a larger number of new members than were added last year.

At the close of the year an apprentice, Mr. C. E. James, was taken on the Garden Staff.

During the month of July, the management of the Belvedere Park at Alipur was made over to the Society.

THE SECRETARY'S REPORT.

CALCUTTA, 1st FEBRUARY, 1900.

To the President and Council of the Agricultural and Horticultural Society of India.

GENTLEMEN,—I now beg to submit a report on the working of the Society during the past year.

Work in office in every branch has been heavy, to cope with which office-hours were lengthened. The accounts exhibit a far better result than they did in 1898, expenses, as will be seen, have been kept down to such an extent that I often found it difficult to meet urgent demands at the Gardens and Nursery. The office establishment has worked under great pressure, to my entire satisfaction.

It is proposed to issue in the hot weather new lists of plants now available for members.

A list of plants added to the Gardens during the past year will be found at the end of this report.

It gives me great pleasure to again testify to the good work done by Mr. Gisseleire at the Nursery and in the Gardens. He has worked hard and taken great pains in the propagation of plants at the Nursery, and in the choicer kinds in the plant-houses and ferneries in the Gardens, and has proved an invaluable help generally.

The results of experiments and work generally at the Gardens and Nursery have been most discouraging, owing to heavy rainfall between the 14th June and 18th August and on the 22nd and 23rd September, also to the absence of winter showers.

Owing to the phenomenal amount of fever experienced by the Garden staff from the middle of July to the end of

December and consequent absences on account of sickness, a great deal of propagation and necessary work was considerably delayed, or left undone. The Garden Munshi was away about one-third of the year owing to sickness.

The work of propagation, as reported last year, has again been carried out by Mr Gisseleire and myself with the aid of six malis. It will thus be a seen that there has been plenty of hard work done by a very small staff at Alipur.

The demand for plants has increased and members have been supplied with a far superior class of plants than they have received in the past. Many new plants imported within the past few years have been propagated to a limited extent and surplus stock disposed of, a percentage being retained for stock.

A small stock of all kinds is carried forward for disposal in 1900. Owing to want of accommodation old sorts now rarely in demand have not been propagated.

The Garden house received its triennial cleaning and repairs at the commencement of last year, and the glass-house and propagating shed were cleaned up.

The plant houses and ferneries were re-covered and newly arranged, these contain large collections of choice plants. An extensive run of wire netting was also put up.

Owing to want of funds no improvements, beyond the clearance of the north-west hedge at the Gardens, and the demolition of an unsightly little plant house, were carried out.

The Rose section has, as usual, proved most unsatisfactory, the heavy showers and flooded state of the plots for days together causing the death of numbers of plants. Such lines as were found incorrectly named were dug up and the bushes were planted out for cut flowers.

A fine stock of Roses was received from Messrs. Wm. Paul & Son and will be propagated during the coming season.

In the foliage section a good deal of heavy work has been done in the way of propagation. Ferns, Crotons, Dracænas and other desirable plants have been well looked after and a large stock of good plants will be available for distribution. The Palm section has also received great attention and the collection, probably the finest in any nursery in India, is a feature of the stock in hand at the Gardens.

The flowering section has received many choice additions and it is hoped that a favourable season will enable us to propagate largely. Several new varieties of Cannas were imported, but none, except *Canna variegata* were found to be of any worth, all being inferior to the present collection. The above variety promises to be a decided acquisition to the foliage class of plants, its richly variegated leaves resembling those of a well coloured Dracæna.

In the orchid section no new species have been added.

The house at the Nursery occupied by Mr. Gisseleire was again thoroughly repaired, and the walls enclosing the greater part of the garden there have been re-plastered.

The plant house at the Nursery was totally wrecked on the evening of the 2nd May by a heavy storm and the entire stock of the choicest Dracænas, Crotons, &c., destroyed, the house was, however, immediately re-erected.

The stock at the Nursery is now very extensive and contains a fine collection of Palms, notably *Areca lutescens*, *Pritchardia pacifica*, *Pinanga maculata*, *Ptycoraphis augusta*, &c., Roses, of which a reserve stock of the best kinds is being

largely added to, Caladiums, Dracænas, Epiphyllums, Cannas, &c.

The demand for Canna plants has been large, while the flowers have been disposed of very extensively. The Maréchal Neil Rose has been grown very largely to meet the heavy annual demands.

Rhea, Tapioca and the Sisal hemp have been planted out on a portion of the land unsuitable for other purposes. Amaryllis cultivation has also been attended to and many varieties with large desirable flowers have been crossed and the seed sown, resulting in a fair crop of seedlings, which, however, are yet too young to flower.

Owing to the heavy rains a large portion of the Rose section suffered severely.

In the fruit section there have been a few additions of desirable kinds of Mangoes. The young trees of Cherimoyer (*Anona cherimolia*) planted out in 1897 are now about 20 feet high, but have not flowered, propagation was again attempted but without success. The Sour-Sop (*Anona muricata*) has also grown to a similar height, but did not, as was expected, flower. The stock of the species from the Upper Congo has been almost disposed of, the seedlings planted out are doing well.

The plantation of Pine-apples has thriven, but only the "Singapur" variety fruited. A specimen fruit of "Giant Kew" was received from Mr. Helps of Baintbarri, Jalpaiguri, and was exhibited at the November Meeting when it turned the scale at 16lb and measured $9\frac{1}{2}'' \times 7''$. The flavour was excellent and, except the skin, the entire fruit was edible.

The seedlings of the Fiji Papaya alluded to in the last Report were planted out at the Nursery in July but

all perished except one, which turns out to be a male plant.

The American Dewberry (*Rubus trivalvis*) after great attention produced a small crop of excellent fruit, about the size of a marble and far superior in flavour to those reported on last year.

The stock of fruit trees was increased by planting out young grafts of various kinds of Oranges, Lemons, Limes, Pomelos, Citrons, Mangoes, also a few Bilimbi and Marian.

The table Fig, Vine and Pear still prove unsatisfactory the two former though easily propagated invariably perish in the rains, while the Pears have not grown since they were planted out.

The Chinese and Japanese varieties of Peach perished in the rains.

In the Experiment section there is little success to record owing to damage done by heavy rain. The two varieties of Egyptian cotton "Abassi" and "Affifi" again gave excellent results in spite of drought in the hot weather and floods in the rains, samples of both varieties were sent to Messrs Wolstenholme and Holland, Liverpool, and were valued at $4\frac{1}{2}d.$ and $4\frac{1}{4}d.$ per pound respectively. A quantity of seed of both kinds was offered to any one desirous of cultivating these varieties, but the offer was not availed of.

Beyond the usual digging up of the plots and sowing of the seed no special care was taken of the Cotton plants in the way of watering or manuring the ground.

An experiment in manuring the various Coffee bushes in the Society's garden, commenced in November 1898 as re-

ported in the Journal and Proceedings, page 986, for April to June 1899, has resulted as follows :—

Bush	A.	Arabian Coffee	unmanured yielded in berries	$11\frac{1}{4}$ oz.
,,	B.	,, ,,	manured, with 2 tablespoons of Ichthemic Guano	,, 1 lb. $3\frac{1}{2}$ oz.
,,	C.	,, ,,	with 4 tablespoons of Bone-meal	,, 1 lb. 12 oz.
,,	D.	,, ,,	3 tablespoons each of Bone-meal and Ichthemic Guano	,, 2 lbs. 5 oz.
,,	E.	Liberian ,,	unmanured	,, 5 oz.
,,	F.	,, ,,	manured with 3 tablespoons of Bone-meal and Ichthemic Guano	,, $9\frac{3}{4}$ oz.

All the bushes are over ten years old, and the branches were not excessively pruned. The average annual yield has hitherto been 10 ounces per Arabian and 6 ounces per Liberian Coffee bush.

The combination of bone-meal and Ichthemic Guano has resulted in a large increase in the yield of berries, but it would be premature to recommend the treatment of Coffee on a large scale until a thorough test has been made of the results for another two or three years.

Experiments in the cultivation of the Vanilla were taken up in earnest last year. Young plants a year or two old were put down at the roots of several mango trees in the rains of 1897, last year one of these flowered in the month of April and the flowers, 19 in number, were fertilized, the pods ripening in December. All pods were gathered as they become ripe and were sun-dried in flannel, developing by the end of the month the characteristic aroma and colour, but owing probably to the sudden stoppage of the rains the majority of the pods were somewhat poor. A fuller report regarding Vanilla cultivation will appear later in the Journal. There would appear to be no reason why Vanilla cultivation should not be successful to a limited extent in Lower Bengal and in similar humid localities.

The cultivation of the Florida Velvet Bean was continued last year, but it in no way proved superior, as regards quality or produce of beans, to the indigenous species (*Kamach*, (*Cowhage*,) *Mucuna pruriens*) growing in its natural state close by. As a fertiliser it was not tested, as the plantation was swamped early in the rains and all plants died.

In the experiment with Yams from Barbados and Natal, the former proved most palatable when lifted and cooked last month, while those from Natal were exceedingly coarse. The cultivation of the Barbados variety has been extended by planting the tops, but the stock is very small at present.

There has been a large demand for Sanseviera roots, while a limited member of Agaves and Rhea have been indented for.

As usual a quantity of seeds of various kinds was distributed but no results have been received to date.

During the year several clumps of the Giant Bamboo flowered and yielded seed, some of which was distributed and the balance sown. After seeding the clumps died and at present there are indications of other clumps flowering in the coming hot weather.

Three kinds of weed destroyers were received for experiment (1) "Acme Powder Weed Killer," (2) "Eureka Weed Killer," (3) "Scrub Eradicator": all three were used on the Garden paths during the rains, the "Acme" soon killed all weeds and grass, but the other two, though destroying weeds and surface rooting grasses, only checked for a short period the growth of *Cyperus rotundus*, known as "*Motha*," which has its bulbous roots deep in the soil, and *Imperata arundinacea*, the "Ulu-ghas," which also roots deep. Babu Lalit Mohun Sinha Roy reports an unsuccessful experiment with the "Scrub Eradicator" on a stretch of "Ulu" grass growing on his estate at Chakdighi in the Burdwan District.

To ensure success it is necessary to use weed destroyers in wet weather.

Experiments with "Ichthemic Guano" were carried out extensively during the past year with excellent results. Ferns, Begonias. Amaryllids, Crotons, Dracænas, Anthuriums, Roses, Palms, &c., were treated with the Guano. The foliage plants made remarkable growth in the rains, all leaves being large and well coloured, among flowering plants the manure was used chiefly in the cold weather and well developed flowers were produced in abundance, but somewhat late. Many persons appear to think that the use of this Guano causes legginess in plants, especially Annuals, but it is probable that only a few doses of the liquid, or one or two applications of the powder have been given and the supply has not been kept up according to instruction. The experiment will be conducted during 1900.

Fifty roots of the Saffron Crocus (*Crocus sativus*) were received from Mr. H. Prasad of Chunar in August for experiment. The bulbs were planted immediately and within two weeks 7 flowers were produced, but none since then. The growth is strong and the bulbs will be cared for during the hot weather and rains with a view to continuing the experiment next season should they survive.

During the hot weather, from the commencement of March to the breaking of the rains, the Aermotor proved of the greatest value, pumping on an average in working hours, *i.e.*, from 6 A.M. to 11 A.M. and from 2 P. M. till 6 P.M., 5,000 gallons daily. With storage tanks and the construction of 2,000 feet more of *pucca* drains the utility of the Aermotor would be greatly enhanced. Owing to the low altitude of the winter breezes, about 40′-50′, and the height of the fans of the machine, 75′, it rarely works during the winter months, or from the middle of October to the

middle of February. A mill on a 40′ tower would prove of great service in the cold weather when the tanks begin to run down and difficulty is experienced in raising water to the surface.

List of Plants added to the Garden Stock in 1899.

Acacia sphærocephala.
Acalypha Godseffiana.
„ Hamiltoniana.
„ hispida (Sanderiana.)
Amasonia punicea.
Aralia Sieboldii.
Aristolochia fimbriata.
Asparagus verticillatus,
„ virgatus.
Barringtonia acutangula.
„ speciosa.
Begonia acerifolia.
„ carminata.
„ incomparablis. [mark.
„ Princess Charles of Den-
„ Socotrana.
„ decora.
„ Eudoxa.
Bignonia unguis.
Bilbergia rosea.
„ Saundersii.
Brachysema acuminata.
Brunsfelsia grandiflora.
Butea minor ?
Canna Aigrette.
„ Alsace.
„ aurea.
„ Aurore.
„ Butterfly.
„ Etendard.
„ Feu d'Artifice.
„ Incendie.
„ J. D. Cabos.
„ Kaiser Wilhelm.
„ Louis de Merode.
„ Météore.
„ Miss Barton.
„ M. François Goss.
„ Panache.
„ Papa.
„ Peach Blossom.
„ Pink Ehmanni.
„ Rosea Unique.
„ Semaphore.
„ Senateur Montifiore.
„ vareigata.
Capparis zeylanica.
Clematis paniculata.
Clerodendron fallax.
„ squamatum.
Costus elegans,
„ musaicus.
Dipladenia amabilis.
„ bolivensis.
„ Brearleyana.
„ hybrida.
„ insignis.
„ splendens.
„ Williamsii.
Dracæna Duchess of York.
„ Exquisite.
„ Godseffiana.
„ Lord Wolseley.
„ The Sirdar.
„ Warreni.
Drimiopsis Kirkii.
Franciscea Hopeana.
Hoya imperialis.
Ipomœa chrysantha.
„ Horsfalliæ.
Lasianthera apicaulis.
Leea amabilis splendens.
Libonia Penrhosensis.
Ligustrum lucidum.
„ Walkerii.
Lonchocarpus formosianus.
Maranta amabilis.
„ Lubbersii.
„ striata.
Medinella magnifica.
Memecylon edule.
Owenia cepidora,
Passiflora Decaisneana.
Phyllocactus Adonis.
„ Agatha.
„ Brilliant.
„ Cooperi.
„ Eurasian.
„ Grand Monarch.
Phrynium variegatum.
Phytolacca decandra.
Plumeria rubra.

Polyalthia longifolia pendula.
Pouzolzia Walkeriana.
Solandra grandifiora magnifica.
Spathodea stipulata.
Stigmaphyllon ciliatum.
Thunbergia Kirkii.
Tupistra macrostigma.
Zizyphus mucronata.

Artocarpus integrifolia "Pudoraj."
Ficus carica "Lucknow."
Citrus Aurantium "Oonshiu."
" decumana, seedless.
" japonica, Long fruited.
" " "To."
Mangifera indica "Amirgola."
" "Bahadya"
" "Baramashi."
" "Bijnor Safeda."
" "Dilpasand Lucknow."
" "Gola."
" "Hardui Langra."
" "Hatijhal."
" "Naspati."
" "Phaizun."
" "Tamancha."

Areca alba.
" concinna.
" glandiformis.
" imperialis.
Archontophœnix crinita.
" rubra.
Arenga Wightii.
Bactris species.
Calamus asperrimus.
" Palembanicus.
Caryota furfurescens.
" Martinii.
Dæmonorops fissus.
" intermedius.
" longipes.
" marginatus.
" melanochætes microcarpus.
" pericanthus.
Euterpe stenophylla.
Licuala amplifrons.
Maximiliana panamensis.
Pinanga Manii.
Raffia ruffia.
Thrinax altissima.
" barbadense.
Wallichia disticha.

Adiantum Capillus-Veneris No. II.
" " " III.
" concinnum latum.
" corsicum?
" crenatum.
" cristatum.
" cuneatum.
" " grandiceps.
" elegantissimum.
" excisum multifidum.
" formosissimum.
" fragrantissimum.
" Henslovianum.
" macrophyllum albostriatum.
" " bipinnatum.
" Pacotii.
" pubescens.
" rhodophyllum.
" rubellum.
" Seemani.
" tenerum No. I.
" " No. II.
" tetraphyllum.
" " acuminatum.
" " gracile.
" tenuissimum.
" tinctum.
" Williamsi.
Blechnum brasiliense.
Chielanthes hirta.
Hypolepis Bergiana.
Nephrodium molle corymbiferum.
Nephrolepis rufescens tripinnatifidum.
Pteris argyreia.
" cretica nobilis.
" Victoria.
Selaginella albo-nitens.
" Braunii.
" canescens argentea.
" Emeliana.
" Galeotii.
" grandis.
" hæmatodes.
" Krausiana aurea.
" Martensii.
" " variegata.
" rubella.
" uncinata.
" Victoriæ.
" viticulosa.
" Wallichii.
" Weldinov

Statement of Receipts and Disbursements

of the Agricultural and Horticultural Society of India for the year ending 31st December 1899.

RECEIPTS.	Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.
Subscription Account.									
By Admission Fees and Subscriptions				15,215	7	0			
Seed Account.									
By sale proceeds of Country seeds, potatoes, &c.	2,348	1	9						
,, sale proceeds of imported and acclimatized seeds for H. M.'s Military gardens and Government	4,273	12	6						
				6,621	14	3			
Printing Account.									
By sale of Proceedings and Journal				6	14	0			
Freight Account.									
By freight recovered				1,248	15	3			
Petty Charges Account.									
By packing and forwarding charges, &c., recovered				2,030	9	0			
Rent Account.									
By rent of a room at Metcalfe Hall and stalls, and land at Alipur for a straining post				1,002	8	9			
Suspense Account.									
By amount at credit of various parties				36	8	6			
Advertisement Account.									
By advertisements in Journal and Proceedings				280	12	0			
Carried over ...				26,443	8	9			

	Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.
Brought forward ...	.....			26,443	8	9			
Flower Show Account.									
By sale of Admission Tickets ...	735	0	0						
,, amount of Special Prizes recovered	534	0	0						
				1,269	0	0			
Metcalfe Hall Account.									
By moiety of petty repairs recovered from the Calcutta Public Library	.....			10	11	0			
Belvedere Park Account.									
By payments from the Public Works Department, Bengal, for maintenance	.....			2,983	1	3			
Garden Account.									
By sale of Fruit Grafts and Ornamental plants, flowers, &c. ...	8,842	1	6						
,, sale of boxes and pots ...	355	1	0						
,, cost of packing, cartage and forwarding plants recovered ...	473	2	6						
				9,670	5	0			
Total ordinary receipts ...	.....			.....			40,376	10	0
EXTRAORDINARY RECEIPTS.									
By Government of Bengal 1899-1900	.....			.....			6,000	0	0
Cash Account.									
By balance in Bank of Bengal on 31st December, 1898 ...	.....			2,436	1	1			
balance in Secretary's hands on 31st December 1898 ...	.....			499	4	8			
							2,935	5	9
GRAND TOTAL Rs. ...							49,311	15	9

DISBURSEMENTS.

	Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.
Seed Account.									
To remitted Messrs. Sutton & Sons...	6,128	15	0						
„ „ „ D. Landreth & Co.	1,865	1	6						
„ „ „ R. Buist & Co. ...	851	4	1						
„ „ „ Haage and Schmidt ...	439	9	6						
„ „ „ Dammann & Co....	3	10	0						
„ „ „ R. Cheeseman & Co.	81	12	0						
„ „ „ Law, Somner & Co.	38	14	0						
„ „ „ Veitch & Sons	30	3	1						
„ „ „ Vilmorin Andrieux & Co ...	4	8	0						
„ Customs Duty on imported seeds	394	5	3						
„ cost of imported seeds locally purchased	877	5	6						
„ cost of acclimatised and country seeds, potatoes, &c., purchased	1,212	1	9						
				11,927	9	8			
Establishment Account.									
To Office establishment, including pension to late Accountant from December 1898 to November 1899				7,849	11	9			
Library Account.									
To subscription to sundry English publications and cost of binding books				117	2	0			
Advertisement Account.									
To advertising Meeting notices, &c.				76	12	0			
Stationery Account.									
To cost of stationery and account books purchased, including printing				89	2	6			
Printing Account.									
To cost of printing Proceedings and Journal July 1898 to September 1899	502	4	0						
„ cost of miscellaneous printing	150	2	6						
				652	6	6			
Freight Account.									
To freight prepaid on Plants and Seeds				1,262	0	3			
Carried over ...				21,974	12	8			

	Rs. A. P.	Rs. A. P.	Rs. A. P.
Brought forward		... ...	21,974 12 8
Economic Trade Sample Account.			
To wages of a Caretaker		35 0 0	
Metcalfe Hall Account.			
To Society's proportion of Municipal taxes ...	592 6 0		
„ „ „ „ repairs ...	457 7 0		
„ advertising rental of room...	54 8 0		
		1,104 5 0	
Fee Account.			
To Expert's fee on specification ...	32 0 0		
„ Auditor's fee	50 0 0		
		82 0 0	
Flower Show Account.			
To amount of Society's prizes ...	387 0 0		
„ „ „ Special prizes recovered	623 0 1		
„ cost of advertising, printing schedules, &c.	132 7 0		
„ cost of cartage, pitching and removing tents	197 13 0		
„ contingencies, including Judges' refreshment, &c.	199 13 0		
		1,540 1 1	
Suspense Account.			
To sundry balances refunded ...	.....	17 6 6	
Petty Charges Account.			
To postages on Proceedings and Journal	67 7 6		
„ postages on Letters, Railway receipts, &c.	198 4 3		
„ cart and coolie hire, landing and clearing plants and seeds, boxes, waxcloth, punkha coolies &c. ...	565 2 4		
„ receipt stamps used ...	30 0 0		
		860 14 1	
Law Charges Account.			
To remitted Mr. G. L. Garth for advice...	.....	100 0 0	
Carried over ...		3,739 10 8	21,974 12 8

	Rs. A. P.	Rs. A. P.	Rs. A. P.
Brought forward ...		3,739 10 8	21,974 12 8
Belvedere Park Account.			
To cost of maintenance from 15th July to 31st December, 1899 ...	.....	3,531 15 6	7,271 10 2
Garden Account.			
To Superintendent's salary ...	1,800 0 0		
„ Garden and Nursery establishment	5,686 15 3		
„ assessments on Garden, October to September, 1899 ...	243 12 0		
„ assessments on Garden house October to September, 1899...	255 2 6		
„ cost of boxes and pots ...	297 10 9		
„ advertising charges ...	34 1 0		
„ cost of angle iron, glass, bamboos, string, &c., for repairs to Plant houses	763 13 0		
„ balance of cost of Aermotor ...	109 11 3		
„ seedlings and materials for propagation	206 14 0		
„ repairs to garden house ...	400 0 0		
„ rent of Nursery, January to December, 1899	300 0 0		
„ assessment on Nursery, October 1898 to December 1899	36 9 0		
„ cost of tools, cloth, carriage of plants, &c.	1,034 15 11		
		11,169 8 8	
Plants Account.			
To cost of Plants purchased ...		800 14 8	11,970 7 4
Total Expenditure Rs. ...			41,216 14 2
Cash Account.			
To balance in Bank of Bengal on 31st December, 1899 ...		7,740 14 8	
„ „ „ Secretary's hands ...		354 2 11	8,095 1 7
GRAND TOTAL Rs. ...			49,311 15 9

T. C. MITRA,
Accountant.

P. LANCASTER,
Secretary & Treasurer.

Examined and found correct.

LOVELOCK & LEWES,
Chartered Accountants.

CALCUTTA,
The 24th February, 1899.

MEMORANDUM.

DISBURSEMENTS.	Rs. A. P.	Rs. A. P.	Rs. A. P.
To ordinary expenditure as per statement	.....	29,246 6 10	
„ ordinary Garden expenditure as per statement	11,169 8 8		
„ cost of plants purchased as per statement	800 14 8		
		11,970 7 4	
			41,216 14 2
„ cash balance in Bank of Bengal on 31st December, 1899 ...	.....	7,740 14 8	
„ cash balance in hand ...	.....	354 2 11	
			8,095 1 7
GRAND TOTAL Rs. ...		.....	49,311 15 9
LIABILITIES			
Amount due to Messrs. Sutton & Sons ... £370 6 11			
Less contribution to Flower Show Fund, 1899 ... ... 6 0 11			
	£364 6 0	@ 1-4 say	5,464 8 0
Office and Garden establishment for December, 1899	.....	1,355 5 6	
Interest on loan from 1st October 1897, to 31st December 1899 ...	.....	1,890 0 0	
			3,245 5 6
Amount due Mrs. Shircore's Trust...	.....	.....	12,000 0 0
TOTAL Rs. ...		.....	20,709 13 6

Examined and found correct.

LOVELOCK & LEWES,

CALCUTTA, 12*th April* 1900. *Chartered Accountants.*

FOR 1899.

RECEIPTS.	Rs. A. P.	Rs. A. P.	Rs. A. P.
By balance in Bank of Bengal on 1st January, 1899 ...	.....	2,436 1 1	
„ balance in hand	.....	499 4 8	2,935 5 9
„ ordinary receipts as per statement	.....	30,706 5 0	
„ Garden receipts	.....	9,670 5 0	
„ Government of Bengal ...	.....	6,000 0 0	
			46,376 10 0
GRAND TOTAL Rs.	.....	.....	49,311 15 9
ASSETS.			
Cash balance on 31st December, 1899.	.....	.....	8,095 1 7
Balance of outstandings for 1896 ...	64 0 6		
„ „ „ „ 1897 ...	120 12 0		
„ „ „ „ 1898 ...	270 11 0		
		455 7 6	
„ „ accounts due by members and others in 1899 ...	421 14 0		
„ „ Subscription, freight, seeds, &c.	590 5 9		
„ „ Plants, packing, &c. ...	1,228 9 3		
		2,240 13 0	
„ due by Messrs. Watson & Scull, London ...	....	496 11 0	
			3,192 15 6
TOTAL Rs.	.....	.....	11,288 1 1
Memo.			
Society's proportion of erecting Metcalfe Hall (1842) ...	.....	23,557 15 9	
Landed Property, including buildings at Alipur	.....	23,907 6 0	
Grant Testimonial Fund in G. P. N. @ 3½%	2,800 0 0		
Interest on do. to 31st December, 1899	344 8 6		
		3,144 8 6	
			50,609 14 3
TOTAL Rs.	.....	.....	50,609 14 3

T. C. MITTRA,
Accountant.

P. LANCASTER,
Secretary and Treasurer.

ESTIMATE FOR 1900.

RECEIPTS.	1897 to 1899. Rs.	A.	P.	1900. Rs.	A.	P.
Subscriptions	15,006	0	0	15,000	0	0
Seed Account.						
Sales of country seeds, &c. ...	2,302	4	0	2100	0	0
„ „ „ imported seeds ...	4,427	1	0	4,400	0	0
Printing Account.						
Sales of publications	11	0	0	20	0	0
Freight Account.						
Freight recovered	1,313	10	0	1,300	0	0
Petty Charges Account.						
Packing, forwarding, &c., recovered .	2,019	9	0	2,000	0	0
Rent Account.						
Rent of stalls, and land at Alipur ...	375	4	0	150	0	0
Suspense Account.						
Balances at credit	61	4	0	50	0	0
Advertisement Account.						
Advertisements in publications ...	103	0	0	150	0	0
Show Account.						
Sale of tickets	402	0	0	450	0	0
Special prizes recovered	560	0	0	650	0	0
Metcalfe Hall Account.						
Petty repairs recovered from Library ...	7	4	0	5	0	0
Belvedere Park Account.						
By Government of Bengal	2,983	1	3	7,000	0	0
Garden Account.						
Sale of Price Lists	1	4	0	2	0	0
„ „ Fruit Grafts ...	320	14	0	300	0	0
„ „ Plants and Flowers ...	5,153	9	6	6,000	0	0
Cartage, packing, forwarding, and boxes and pots sold, &c.	714	9	0	750	0	0
Extraordinary Receipts—By Government of Bengal	6,000	0	0	6,000	0	0
Total Rs. ...	41,761	9	9	46,327	0	0

DISBURSEMENTS.	1897 to 1899			1900.		
Seed Account.	Rs.	A.	P.	Rs.	A.	P.
Remitted to R. Cheeseman	81	12	0	150	0	0
„ „ Law, Somner & Co. ...	38	4	0	.....		
„ „ Vilmorin, Andrieux & Co. ...	4	8	0	.....		
„ „ D. Landreth & Sons ...	1,263	0	0	.....		
„ „ R. Buist & Co.. ...	614	0	0	.....		
„ „ Haage & Schmidt ...	596	0	0	100	0	0
„ „ Dammann & Co. ...	37	0	0	50	0	0
„ „ Watson & Scull ...	16	0	0	50	0	0
„ „ Veitch & Sons ...	30	0	0	500	0	0
To be remitted Sutton & Sons ...	6,554	7	3	5,500	0	0
Duty on seeds imported	428	0	0	450	0	0
Imported seeds locally purchased ...	557	12	3	500	0	0
Country seeds „ „ ...	1,411	0	0	1,400	0	0
Establishment Account ...	7,580	0	0	7,850	0	0
Library Account	96	0	0	100	0	0
Advertisement Account	47	0	0	50	0	0
Stationery Account	87	0	0	90	0	0
Printing Account	629	3	6	600	0	0
Freight Account	1,354	0	0	1,300	0	0
Museum Account	63	0	0	60	0	0
Metcalfe Hall Account.						
Taxes and petty repairs	649	0	0	600	0	0
Interest account	478	6	6	2,310	0	0
Fee Account.						
Auditor's fee	50	0	0	50	0	0
Flower Show Account.						
Society's prizes	568	0	0	500	0	0
Printing and Advertisements ...	163	0	0	170	0	0
Cartage, pitching, removing tents, &c. ...	197	0	0	250	0	0
Refreshment for Judges, Band, Police, Coolies, &c.	234	0	0	250	0	0
Special prizes	687	0	0	600	0	0
Suspense Account.						
Balances paid	19	0	0	50	0	0
Petty Charge Account.						
Postages on publications, &c. ...	74	1	6	75	0	0
Postages on letters,circulars, &c. ...	187	0	0	200	0	0
Carts, coolies, landing, clearing, forwarding seeds, &c.	553	0	0	550	0	0
Receipt stamps	29	0	0	30	0	0
Carried over ...	38,495	4	8	40,675	0	0

	1897 to 1899			1900.		
	Rs.	A.	P.	Rs.	A.	P.
Brought forward ...	38,495	4	8	40,675	0	0
Law Charges Account	38	10	8	90	0	0
Belvedere Account	3,351	0	0	6,000	0	0
Garden Account.						
Head Gardener's salary	1,704	0	0	1,800	0	0
Garden and Nursery establishment ...	6,425	0	0	6,500	0	0
Garden house assessment	204	0	0	205	0	0
Garden assessment	195	0	0	195	0	0
Boxes, pots, &c.	570	0	0	600	0	0
Advertisements, price lists, &c. ...	148	3	0	300	0	0
Repairs to plant houses, roads, &c., ...	473	0	0	600	0	0
Repairs to Garden house	169	0	0	50	0	0
Repairs to Nnrsery-house and walls ...	149	7	2	225	0	0
Rent of Nursery	300	0	0	300	0	0
Assessments on Nursery	35	0	0	35	0	0
Seedlings and materials for propagation ...	260	0	0	200	0	0
Carriage of plants, cost of tools, &c. ...	1,143	2	2	1,000	0	0
Plant Account.						
Plants purchased	1,586	0	0	1,500	0	0
Total Rs. ...	42,137	14	0	43,985	0	0

MEMO.

Total disbursements—Average 1897 to 1899	42,137	14	0			
Less receipts—Average 1897 to 1899	41,761	9	9			
Average total loss ...	376	4	3			
Average cash balances, 1897 to 1899	4,054	1	9			
Less average loss 1897 to 1899	376	4	3			
Average credits ...	3,677	13	6			
Estimated receipts for 1900	.....			46,327	0	0
Less estimated disbursements ...	.....			43,985	0	0
Estimated credit ...	.....			2,342	0	0
Cash balance on 1st January, 1900 ...	.....			8,095	1	7
Balance with Watson & Scull ...	.....			496	0	0
„ „ D. Landreth & Sons ...	.....			111	0	0
„ „ Sutton & Sons ...	.....			90	11	0
Estimated credit balance on 31st December 1900 ...	.....			11,134	12	7

AGRICULTURAL AND HORTICULTURAL SOCIETY OF INDIA.

The Ordinary General Meeting held at the Metcalfe Hall, on Wednesday, the 10th January 1900.

Present :

Mr. H. C. Eggar, *President, in the Chair.*

Babu Protab Chandra Ghosa.
His Grace Archbishop Goethals.
Raja Peary Mohun Mukerjee, c.s.i.
Mr. F. G. Clarke.

Mr. P. Lancaster. *Secretary.*

The Proceedings of the last meeting held on the 13th December, 1899, were read and confirmed.

The following were proposed and elected as ordinary members :—

Mr. A. C. Curtis, Colgong, E. I. R., proposed by His Grace Archbishop Goethals, seconded by Raja Peary Mohun Mukerjee, c.s.i.

Mr. H. W. Knight, Calcutta, proposed by Mr. T. Bashford, seconded by Babu Protab Chandra Ghosa.

The Manager, Tara Tea Co., Ld., Dum Duma, Assam, proposed by Mr. P. Lancaster, seconded by His Grace Archbishop Goethals.

CONTRIBUTIONS.

The Indian Forester, Vol. XXV, Nos. 11 and 12, for November and December 1899. From the Editor.

The Indian Gardening, Vol. V, Nos. 24, 25 and 26, for December 1899, and Vol. VI, Nos. 1 and 2, for January 1900. From the Editor.

The Chemist and Druggist, Vol. LV, Nos. 1036 to 1040, for December 1899. From the Editor.

The American Florist, Vol. XV, Nos. 598 to 601, for December 1899. From the Editor.

The May Flower, Vol. XV, for December 1899. From the Editor.

The Planter, Vol. VII, New Series, Nos. 67, 68 and 69 for December 1899, Vol. VIII, Nos. 1 and 2, New Series, for January 1900. From the Editor.

The Indian Sportsman, Vol. II, Nos. 1, 2 and 3 for December 1899, Nos. 4 and 5 for January 1900. From the Proprietor.

Report of the Management of the District Gardens in the Central Provinces for the Year 1898-99. From Deputy Commissioner.

The Sugarcane, Vol. I, No. 12, for December 1899, From the Editor.

The Perak Government Gazette, Vol. XII, Nos. 34 and 35, for November 1899. From Government of Perak.

Report on the Nagpur Experimental Farm in the Central Provinces for the year 1898-99. Ending 31st March 1899. From the Director.

Returns on the Rail and River-borne Trade of Bengal during the quarter ending the 30th June, 1899. From Government of Bengal.

The Perak Government Gazette, Vol. XII, Nos. 36. 37 and 38, for December 1899. From Government of Perak.

Bulletin of Miscellaneons Information, Appendix II and III of 1899. From Royal Garden, Kew.

Proceedings of the Eleventh Annual Meeting of the Association of Economic Entomologists, Washington. From the Director.

Bulletin of the Botanical Department Jamaica, for November 1899. From the Director.

The Agricultural Ledger, No. 9 of 1899, 2 copies. From Government of India.

The Canadian Horticulturist for December 1899. From the Editor.

Proceedings of the Agri.-Horticultural Society, Madras, for the months of April to June and July to September, 1899. From the Society.

From Government of India, Revenue and Agricultural Department, 5 copies each—

Memorandum on the prospects of the winter Oilseeds crop, Wheat crop, Indigo, Rice, Cotton, Til and Ground-nut crop, for 1899-1900.

A Sugarcane Pest in Madras, Vol. II, Bulletin No. 36. From the Director, Dept. of L. R. and Agri., Madras.

The Ground-nut, Vol. II, Bulletin No. 37. From Director Department of Land Records and Agriculture, Madras.

PRESENTATIONS.

MR. E. H. MAN, C.I.E., Port Blair—

Four cases of plants.

THE SUPERINTENDENT, GOVERNMENT AGRI.-HORTICULTURAL GARDEN, LAHORE—

One packet of seed.

Two hundred plants.

MESSRS. J. CARTER & Co., London—

Fifty packets of seed.

Exchanges.—Since last Meeting there have been only two exchanges of Plants, *viz.*, with Port Blair and Allahabad.

References.—Owing to the Christmas holidays the references are smaller in number than usual, *viz.*, 21 on Agricultural subjects, 45 on Horticultural matters, and 15 references from various Government offices. Eighteen Botanical specimens were received for identification.

Flower Show, 1900.—The printed Schedule of Prizes offered for competition was read and approved, and the following gentlemen were elected as Judges :—His Grace Archbishop Goethals, the Hon'ble Mr. J. Buckingham, C.I.E., Mr. E. J. King, Mr. H. G. Hein, Mr. G. T. Lane, Dr. K. C. Bose, Rai Bahadur, Mr. G. Girard. Mr. A. E. P. Griessen. Mr. H. G. St. J. Jackson, Rai P. C. Bannerjee, Bahadur.

THE FLOWER SHOW, 1900.

THE Society's Annual Flower Show was held on Friday and Saturday, the 16th and 17th February, on the site on the *Maidan* occupied last year. The attendance at the show, notwithstanding the several meetings and functions at which His Excellency the Viceroy, His Honour the Lieutenant-Governor of Bengal, and the majority of the leading members and citizens of Calcutta were present, was fairly good.

During the evening of Friday, the 16th, the Band of the 12th (Kelat-i-Ghilzai) Regiment, kindly lent by the Officers of that Regiment, enlivened the proceedings at intervals.

The arrangements were similar to those of last year, with the exception of two sides of the quadrangle, which consisted of large tents, whereas only the front line last year was put under the larger and wider tents. A refreshment tent was also placed within the enclosure.

The following gentlemen acted as Judges:—For the General Section: Mr. H. C. Eggar, *President*. The Honourable Mr. J. Buckingham, C.I.E., Mr. E. J. King, Mr. H. G. Hein, Mr. G. T. Lane, Mr. H. St. J. Jackson, Mr. A. E. P. Griessen, Mr. A. J. B. Gisseleire, and Mr. P. Lancaster, *Secretary*. For the Vegetable and Fruit Section: Mr. G. Girard, Dr. Kailas Chunder Bose, Rai Bahadur, and Babu Tulsi Charn Mitter.

In the Foliage and Flower Sections of number of entries exceeded those registered last year, but in quality there was a falling off in some branches, especially among foliage plants, roses, both cut and in pots, and bouquets, while on the other hand the exhibits of annuals and orchids shewed a marked improvement. In the Vegetable and Fruit Sections

the exhibits were poor in comparison to those shown in past years. The vegetables raised from seed supplied by Messrs. Sutton & Sons of Reading, and Messrs. D. Landreth and Sons of Philadelphia, carried off all the chief prizes.

A feature of the Show was the very fine exhibit (not for competition) of flowers, fruit and vegetables from the gardens of His Highness the Maharaja Bahadur of Darbhanga, staged by his Superintendent, Mr. H. Thorne.

Mr. G. Girard of Goosery exhibited some excellent specimens of tomatoes, potatoes, lemons, peas, and cut annuals.

The Royal Botanical Garden, Calcutta, sent a noteworthy group of plants, a second group being furnished by the Society. Messrs. Octavius Steel & Co., Calcutta, representing the firm of Ramsome, Sims & Jeffreys, Ld., Ipswich, exhibited a set of lawn-mowers, together with a very large stand containing copies of the many gold and silver medals awarded to the manufacturers.

The Council note with regret the continued absence of competition.

The following is a complete list of Prize Winners, with the Judges' remarks :—

SPECIAL PRIZES.

(Under Cover.)

Presented by	Prize.	Awarded to
H E the Viceroy	... A Silver Medal	... Babu Aukshoy Coomar Ghose
(Colour wanting, arrangement good.)		
The Council of the Society	... Do	A A Apcar, Esq
(Very bright creditable arrangement, arrangement faulty.)		
H H the Maharaja Bahadur of Kuch Behar	... ... Rupees 25	... Kristo Maiti
(Very pretty group, plants not good specimens.)		
The Society	... ... The Grant Silver Medal	... H H the Maharaja Bahadur of Kuch Behar

Presented by	Prize.	Awarded to
Raja Ashutosh Nath Roy ...	A Silver Medal ...	A A Apcar, Esq.
H H the Maharaja Bahadur of Kuch Behar	Do. ...	Babu Aukshoy Coomar Ghose
Babu Hem Chunder Mitter ...	Do. ...	Babu Aukshoy Coomar Ghose
Lalit Mohun Sinha Roy, Esq ...	Do. ...	Babu Chuni Lall Banerji
D M Cussoobhoy, Esq. ...	Do. ...	Munshi Ibrahim Ali
Raja Joyti Prosad Gorgo ...	Do. ...	A A Apcar, Esq
	(Collection poor.)	
A K Basu, Esq	Do. ...	Babu S. P. Coondoo
Sorabji Dadabhoy Dubash, Esq	Do. ...	Kristo Maiti
Ghaneshamdass Goenka, Esq ...	Do. ...	Babu Joy Gobind Law, C.I.E.
Raja Ashutosh Nath Roy ...	Do. ...	Babu Aukshoy Coomar Ghose
Maharaja Bahadur Sir Norendra Krishna, KCIE	Do. ...	Babu Chuni Lall Banerji
The Editor and Proprietor, "Indian Gardening" ...	A copy of Indian Gardening free for one year ...	The Secretary, Indian Gardening Association
Babu Joy Gobind Law, C.I.E....	Rupees 16 ...	F Morgan Esq
H H the Nawab Shams-i-Jehan Begum of Murshidabad, C.I....	Rupees 50 ...	Kristo Maiti
Dr. Kailas Chunder Basu, Rai Bahadur	A Silver Medal ...	S P Coondoo
The Editor and Proprietor "Indian Gardening" ...	A Silver Vase ...	Kristo Maiti
The Hon'ble Maharaja Bahadur Sir Jotendro Mohan Tagore, K.C.S.I.	Rupees 32 ...	Babu Chuni Lall Banerji
Rai Prosono Coomer Banerji Bahadur	Rupees 16 ...	Do.
The Editor and Proprietor, "Indian Gardening" ...	A copy of Indian Gardening for one year ...	Babu S P Coondoo
Rajah Peary Mohan Mukerjee, C.S.I.	A Silver Medal ...	Mrs Gatcke
Kedar Nath Goenka, Esq ...	Do.	Mohendra Nath Mohapatra
P Lancaster, Esq	Do.	Kristo Maiti
Aukshoy Coomar Ghose, Esq .	Rupees 16 ...	No award
"Ichthemic Guano Co." ...	A Silver Medal ...	Madhub Dass
Gopi Nath Dutt, Esq ...	Do.	Babu Chuni Lall Bannerji
Babu Amrita Nath Dass ...	Rupees 10 ...	Kristo Maiti

Presented by	Prize.	Awarded to
The Hon'ble Prince Mahomed Bukhtyar Shah, C.I.E.	... Rupees 10	... Anukul Hazra

Messrs. Sutton & Sons. For the best collection of Vegetables of varieties raised from Seeds by the Exhibitors :—

First Prize	Rupees 20	... Sossi Bhusan Bera
Second ,, ...	,, 15	... Kristo Sansmall
Third ,, ...	,, 10	... Prem Chand Dass
Fourth ,, ...	,, 8	... Adaitiya Ghata
Fifth ,, ...	,, 6	... Bhagobat Sahoo
Sixth ,, ...	,, 4	... Dhruba Hazra

Messrs. David Landreth & Sons. For the best collection of Vegetables grown from Landreth's Seeds :—

The best collection ...	Rs. 40	... B Ghose
The Second best ...	,, 25	... P C Dass
,, Third best	,, 15	... H D Hazra
Cabbage, Bloomsdale	3 heads, Rs. 5	... P C Dass
Cauliflower, Landreth's First...	3 ,, 4	... A C Hazra
Carrots, Yellow Danver's	12 roots, 4	... M Dass
Cucumber, Early White Spine	12 fruits, 4	... B N Dass
French Beans in pod, Scarlet..	1 seer, 4	... B C Hazra
Peas in pod, Extra Early ...	1 ,, 6	... N Hazra
Radish, Bloomsdale ...	12 roots, 4	... P C Dass
Tomatoes, The Beauty ...	12 fruits, 4	... S B Bera
,, Landreth's Ten Ton	12 ,, 4	... A Maiti

IN THE QUADRANGLE.

H. H. the Lieutenant-Governor of Bengal ...	A Silver Vase	... Kristo Maiti
H. H. the Nawab Bahadur of Murshidabad ...	A Silver Medal	... Wahid Bux
Lalit Mohun Sinha Roy, Esq.	Do.	Kristo Maiti
Rai Hari Ram Goenka Bahadur	Do.	Kristo Maiti
Rai Prosono Coomar Bannerjee Bahadur ...	Rupees 16	... Babu H D Addy

Messrs. Sutton & Sons. For the best collection of Asters raised from Seeds by the Exhibitors :—

First Prize	Rs. 10	... Miss Cruickshank
Second ,, ...	,, 8	... Major H J Dyson, I.M.S.
Third ,, ...	,, 6	... G. Foster, Esq.
Fourth ,, ...	,, 4	... D F Mackenzie, Esq
Khan Bahadur Mirza Shujaat Ali Beg	A Silver Medal	... Panchu
H. H. the Nawab Bahadur of Murshidabad ...	Rupees 32	... Kristo Maiti

Presented by	Prize.	Awarded to
The Ichthemic Guano Co. ...	A Bronze Medal ...	Panchu
Mooralidhur Goenka, Esq. ...	A Silver Medal ...	Babu P K Biswas
Brojo Mohun Goenka, Esq.	Do. ...	Kristo Maiti

ORDINARY PRIZE LIST.

Division A.

Orchids, 4 dissimilar kinds ...	Rs. 5	...	Sribash
„ best specimen ...	„ 3	...	Guru Churn
Roses, H P, 4 dissimilar kinds ...	„ 3	...	Kristo
Roses, Tea, 4 „ „ ...	„ 3	...	Do.
Roses, best specimen ...	„ 2	...	Do.
Ferns, 6 „ „ ...	„ 3	...	Do.
„ best specimen ...	„ 3	...	No award
Begonias, 8 „ „ ...	„ 3	...	No award
Dracænas, 6 „ „ ...	„ 3	...	Kristo
Roses, 6 „ „ ...	„ 5	...	Do.
Tea Roses, 6 „ „ ...	„ 3	...	No award
Cut flowers	Rs. 5	...	Wahid Bux
Verbenas, 6 dissimilar kinds ...	„ 3	...	Kristo
Dianthus, 5 „ „ ...	„ 3	...	Do.
Pansy, 5 „ „ ...	„ 3	...	Do.
Phlox, 6 „ „ ...	„ 3	...	Panchu
Petunias, 5 „ „ ...	„ 3	...	Kristo
Portulacas, 4 „ „ ...	„ 3	...	Do.
Geraniums, 3 „ „ ...	„ 3	...	A S Lovelock, Esq.
Nasturtiums, 5 „ „ ...	„ 2	...	Kristo
Mignonette, 2 „ „ ...	„ 2	...	Do.
Heliotrope, 2 „ „ ...	„ 2	...	Do.
Poppies, 4 „ „ ...	„ 3	...	D F Mackenzie, Esq.
Carnations, Marguerite, 4 pots ...	„ 3	...	Panchu
Violets, best 6 pots in flower ...	„ 3	...	D F Mackenzie, Esq.
Creepers, 4 dissimilar kinds ...	„ 3	...	Kristo
Bulbous Plants, or Flowering Shrubs, 5 dissimilar kinds, ...	„ 5	...	Do.
Collection of not less than 20 pots, of not less than 12 dissimilar kinds of annuals, in flower ...	„ 5	...	Wahid Bux
Tastefully arranged group of well-grown plants, either annuals, or perennials, or both ...	„ 10	...	Do.

Division B.

Orchids, 4 dissimilar kinds ...	Rs. 5	...	L Johnstone, Esq.
„ best specimen ...	„ 3	...	J Michael, Esq.
Roses, H P, 4 dissimilar kinds ...	„ 3	...	C L Banerji
Roses, Tea, 4 „ „ ...	„ 3	...	No award
Ferns, 4 „ „ ...	„ 3	...	Babu A C Ghose
„ Adiantum 4 „ „ ...	„ 3	...	C L Banerji

Division B.—*Concluded.*

Ferns, best specimen	of any kind ...	Rs.	2	M S Manasseh, Esq.
„ do	Adiantum ...	„	3	... Do.
Begonias, 4 dissimilar kinds	...	„	3	... A A Apear, Esq.
Do., grown specimen	...	„	2	... Do.,
Dracænas, 6 dissimilar kinds	...	„	3	... H. H. the Maharaja of Kuch Behar
Rare and handsome plants, not before exhited, not less than 3 dissimilar kinds	... ...	„	5	... No award
Roses, 6 dissimilar kinds	...	„	3	... Do.
Roses, 4 „ „	...	„	2	... Do.
„ Tea 6 „ „	...	„	3	... C L Banerji
„ best single specimen	...	„	2	... No award
Do., Tea do.	...	„	2	... Do.
Cut Flowers, best collection	...	„	5	... C L. Banerji
Cut Annuals, „	...	„	4	... M N Mohaptra.
Bridal Bouquet of white flowers	...	„	5	... Ashutosh Dass
Bouquet for Ball-room	...	„	4	... L Johnstone, Esq.
Coleus, 8 dissimilar kinds	...	„	3	... G Foster, Esq.
Verbenas, 4 „ „	...	„	3	... D F Mackenzie, Esq.
Dianthus, 5 „ „	...	„	3	... Do.
Pansy, 5 „ „	...	„	3	... M N Mohapatra
Phlox, 5 „ „	...	„	3	... Do.
Petunias, 5 „ „	...	„	3	... G Foster Esq.
Portulacas, 4 „ „	...	„	3	... Major H J Dyson, I.M.S.
Geraniums, 3 „ „	...	„	3	... A S Lovelock, Esq.
Mimulus, 3 „ „	...	„	3	... No award
Nasturtiums, 5 „ „	...	„	3	... D F Mackenzie, Esq.
Carnations, Marguerite, 4 pots	...	„	3	... G Foster, Esq.
Dahlias, 3 do.	...	„	3	... Major H J Dyson, I.M.S.
Mignonette, 2 do.	...	„	2	... D F Mackenzie, Esq.
Heliotrope, best collection	...	„	3	... Do.
Poppies, 3 pots	...	„	3	... Do.
Violets, 6 do.	...	„	3	... Do.
Creepers, 4 dissimilar kinds	...	„	3	... M N Mohapatra
Flowering Shrubs, or Bulbous plants, 6 do.	... ...	„	5	... Do.
Collection ef not less than 15 pots of not less than 7 dissimilar kinds of annuals	... ...	„	4	... D F Mackenzie, Esq.
Tastefully arranged group of well-grown plants, either annuals, or perennials, or both	... ...	„	10	... Babu A C Ghose

FRUITS.

First Prizes.

Pineapple, best plate of 3	...	Rs.	3	... G C Das
Papaya, do. of 3	...	„	3	... S B Karan
Bael, do. of 3	...	„	3	... T L Bera

Cocoanuts	do.	of 3 varieties ...	Rs. 3	... N N Das
Guavas,	do.	of 6 ...	„ 3	... A Bera
Lemons and Limes, best plate of 12, 3 varieties		...	„ 3	... B N Shome
Plums, long,	do.	of 50...	„ 3	... T C Das
Do. round,	do.	of 30 ...	„ 3	... M Das
Plantains,	do.	of 6 varieties ...	„ 6	... M N Das
Pomeloes,	do.	of 6 ...	„ 5	... M C Das
Sapotas,	do.	of 12...	„ 3	... T C Das
Tiparrees, small basket		...	„ 3	... S B Karan

Second Prizes.

Pineapple, best plate of 2			... Rs. 2	... B N Das
Papaya,	do.	of 2	... „ 2	... B C Dey
Bael,	do.	of 3	... „ 2	... B N Das
Cocoanuts,	do.	of 2 varieties	... „ 2	... M N Das
Guavas, best plate of		6	... „ 2	... K Mandal
Lemons and Limes, 9,	do.	of 3 varieties	... „ 2	... G N Bera
Plums, long	do.	of 30	... „ 2	... P C Sett
Do. round,	do.	of 30	... „ 2	... Do.
Plantains,	do.	of 4 varieties	... „ 4	... B Ghose
Pomeloes,	do.	of 4	... „ 3	... B N Das
Sapotas,	do.	of 8	... „ 2	... G C Das
Tipparees, small basket			... „ 2	... K Mandal

VEGETABLES.

First Prizes.

Artichoke, best plate of 6 heads			... Rs. 4	... R Mana
Brocoli,	do.	of 4 do.	... „ 4	... B Sahoo
Beet,	do.	of 8 do.	... „ 4	... T K Das
Brussels Sprouts, best plate of 6 heads			„ 4	... N Das
Cabbages,	do.	of 3 varieties	... „ 5	... K Das
Cauliflowers,	do.	of 4	... „ 4	... S Bera
Capsicums,	do.	of 6 in 3 varieties	... „ 3	... N Das
Carrots,	do.	of 12	„ 3	... T L Bera
Celery, best plate of 3			... „ 4	... A Jena
Cucumbers,	do.	of 2	... „ 3	... M Das
French beans, in pod,	do.	of 20	... „ 3	... B Hazra
Knol-Khols,	do.	of 6	... „ 3	... K Sansmal
Lettuces,	do.	of 3 varieties	... „ 3	... G Bera
Indian Corn, in pod, best plate of		6	.. „ 3	... M Das
Peas, in pod	do.	of 50	... „ 5	... N Hazra

Pot Herbs, best assortment	... Rs.	4	... J Bera
Tomatoes, best plate of 12	... „	3	... D Hazra
Potatoes, not less than 12	... „	5	... S Dass
Turnips, do. 12	... „	3	... Do.
Best Dalli of Vegetables	... „	10	... P C Dass

Second Prizes.

Artichoke, best plate of 5 heads	... Rs.	3	... S Bera
Brocoli, do. of 4 do.	... „	3	... G N Das
Beet, do. of 6 do.	... „	3	... G D Bera
Brussels Sprouts, best plate of 5 heads	„	3	... G N Das
Cabbages, do. of 3 varieties	... „	3	... U Sansmal
Cauliflowers, do. of 3	... „	2	... A Hazra
Capsicums, do. of 6 in 3 varieties	... „	2	... J Bera
Carrots, do. of 12	... „	2	... A Jena
Celery, do. of 3	... „	3	... H C Das
Cucumbers do. of 2	... „	2	... M N Dass
French Beans, in pod, best plate of 20	„	2	... G Ghata
Knol-Khols, do. of 6	... „	2	... T S Samanta
Lettuces, do. of 3 varieties	... „	2	... B Hazra
Indian Corn, do. of 6	... „	2	... H D Hazra
Peas, in pod, do. of 50	... „	3	... B Hazra
Pot Herbs, best assortment	... „	3	... J C Samanta
Tomatoes, best plate of 12	... „	2	... B N Bera
Potatoes, not less than 12	... „	4	... Do
Turnips, do, 12	... „	3	... J Jena
Best Dalli of Vegetables	... „	8	... U Bera

AGRICULTURAL AND HORTICULTURAL SOCIETY OF INDIA.

The Annual Meeting held at Metcalfe Hall, on Wednesday, the 14th March, at 4-30 p.m.

Present:

MR. H. C. EGGAR, *President, in the Chair.*

BABU PRATAPA CHANDRA GHOSA.	BABU JOY GOBIND LAW, C.I.E.
MAJOR D. PRAIN, I.M.S.	RAJA P. M. MUKERJEE, C.S.I.
THE HON'BLE MR. F. A. SLACK, C.S.	MR. W. D. CRUICKSHANK.
MR. C. M. LANCASTER.	RAI PROSONO COOMAR BANERJEE, BAHADUR.
MR. F. G. CLARKE.	MR. E. J. KING.

The Annual Report and Balance sheet for 1899, together with Estimate for 1900, were laid before the Meeting and adopted.

The election of Officers and Council was then proceeded with for the year, with the following results :—

President.—H. C. Eggar, Esq.

Vice Presidents.—W. D. Cruickshank, Esq., Major D. Prain, I.M.S., The Hon'ble Mr. F. A. Slack, C.S., G. Girard, Esq.

Council—Babu Joy Gobind Law, C.I.E., His Grace Archbishop Goethals, Babu Pratapa Chundra Ghosa, F. G. Clarke, Esq., A. K. Muir, Esq., Raja Peary Mohun Mukerji, C.S.I., E. J. King, Esq., The Hon'ble Prince Mahomed Bukhtyar Shah, C.I.E., J. W. Baker, Esq., W. Graham, Esq., J. A. Anderson, Esq., Rai Prosono Coomar Banerjee, Bahadur.

The Proceedings of last meeting were read and confirmed.

The following gentlemen were proposed and elected as ordinary Members :—

The Maharaja Rana of Jhalawar, Rajputana, proposed by Mr. W. D. Cruickshank, seconded by the Hon'ble Mr. F. A. Slack, C.S.

Mr. A. F. Cox, C.S., Rainey Park, Ballyganj, proposed by Mr. B. G. Geidt, C.S., seconded by Major D. Prain, I.M.S.

The Hon'ble Mr. Justice J. F. Stevens, 240 Lower Circular Road, proposed by the Hon'ble Mr. W. B. Oldham, I.C.S., C.I.E., seconded by Babu Joy Gobind Law, C.I.E.

Mr. S. Sinha, Allahabad, proposed by Mr. B. E. O'Conor, seconded by Babu P. C. Ghosa.

Mr. H. S. Smith, Chota Pukoi, Charali P. O., Bishnath, Assam, proposed by the Hon'ble Mr. J. Buckingham, C.I.E., seconded by Mr. W. D. Cruickshank.

Mr. A. K. Basu, F.R.H.S., proposed by Mr. P. Lancaster, seconded by Babu Joy Gobind Law, C.I.E.

Mr. H. W. Cassells, Calcutta, proposed by Mr. F. G. Clarke, seconded by Major D. Prain, I.M.S.

Mr. A. H. Clayton, C. S, Giridi. E. I. R., proposed by the Hon'ble Mr. F. A. Slack, C.S., seconded by Mr. H. C. Eggar.

Mr. Preo Kisto Biswas, Eden Gardens, proposed by Rai P. C. Banerjee Bahadur, seconded by Mr. C. M. Lancaster.

CONTRIBUTIONS.

The Chemist and Druggist, Vol. LVI, Nos. 1041 to 1048, for January and February 1900. From the Editor.

American Florist, Vol. XV, Nos. 602 to 608 and 610. From the Editor.

The Sugarcane, Vol. II, Nos. 13 and 14, for January and February 1900. From the Editor.

Indian Gardening, Vol. VI, Nos. 3 to 10, January, February and March 1900. From the Editor.

The Planter, Vol. VIII, New Series, Nos. 3 to 9, for January, February and March 1900. From the Editor.

The Indian Sportsman, Vol. II, Nos. 6 to 13, for January, February and March 1900. From the Editor.

Journal of the Royal Agricultural Society of England, Third series, Vol. 10th, part IV, No. 40 dated 30th December 1899. From the Society.

Report on Publications issued and registered in the several Provinces of British India during the year 1898-99. From Government of Bengal.

Agricultural Statistics of the Lower Provinces of Bengal for 1898-99. From Government of Bengal.

Monograph on the Woollen Fabrics of Bengal, by Mr. N. N. Banerjee, B.A.M., R.A.C.S., &c., Asst. Director Department of Land Records and Agriculture, Bengal. From Government of Bengal.

Agricultural Series No. 4 Department of Land Records and Agriculture, Bengal, Bulletin No. 5 of 1899. From the Director.

Proceedings of the Asiatic Society of Bengal, No. X, for December 1899. From the Society.

Journal of the Asiatic Society of Bengal, Vol. LXVIII, part II, No. 3 of 1899. From the Society.

The Perak Government Gazette, Vol. XIII, Nos. 1 to 6, for January and February 1900. From Government of Perak.

The May Flower, for January and February 1900. From the Editor.

Journal of the Bombay Branch of the Royal Asiatic Society, Vol. XX, No. LV. From the Society.

Proceedings of the Agri.-Horticultural Society of Madras, for April, June, July and September 1899. From the Society.

Bulletin No. 21, New Series, U. S. Department of Agriculture, Washington. From the Director.

Indian Museum Notes, issued by the Trustees, Vol. IV, Nos. 4 and 5. From Government of Bengal.

Report on Rail-borne Traffic of Bengal during the year 1898-99. From Government of Bengal.

Bulletin of the Botanical Department, Jamaica, New Series for December 1899. From the Director.

The Canadian Horticulturist, for January 1900. From the Editor.

Bulletin de la Societé Imperiale des Naturalists de Moscow. From the Society.

Proceedings of the Asiatic Society of Bengal, No. XI, and No. 1 of 1900. From the Society.

Bulletin of Miscellaneous Information, Appendix IV of 1899. From Royal Garden, Kew.

Report on the Roadside Aboriculture in the Central Provinces during the year 1897-98 and 99. From the Director Department of Land Records and Agriculture, Central Provinces.

Agricultural Ledger No. 1041, 2 copies each. From Government of India.

The Indian Forester, Vol. XXVI, Nos. 1 and 2, for January and February 1900. From the Editor.

Bulletin of the Botanical Department, Jamaica, New Series, Vol. VII, part 1, for January 1900. From the Director.

Returns of the Rail and River-borne Trade of Bengal for quarter ending the 30th September 1899. From Government of Bengal.

PRESENTATIONS.

MR. E. H. MAN, C.I.E., Port Blair—
Four cases of plants.

THE SUPERINTENDENT, RAJ GARDENS, DARBHANGA—
Twenty-five plants.

THE SUPERINTENDENT, AGRI.-HORTICULTURAL GARDENS, LAHORE—
One hundred and twenty-five plants.

Exchanges.—Since last Meeting plants and seeds have been exchanged with various firms and gardens in Australia, Singapur, Germany, England, Mauritius, United States of American, Java and in this Country.

References.—Fifty-one references on Agricultural and 76 on Horticultural matters were received by the Society and 28 from various Government offices.

Thirty-nine Botanical specimens were received for identification.

The Metcalfe Hall.—The following letter signed by six members of the Society in terms of Chapter XI, Section 4 of the Bye-Laws was read.

To the President,
Agricultural and Horticultural Society of India.

We, the undersigned members of the Agricultural and Horticultural Society of India, do hereby in pursuance of the provisions in this behalf contained in the Bye-Laws of the Society require you to convene a Special General Meeting of the Society to be held on Friday, the 27th April, 1900, at 4-30 o'clock p.m., for the purpose of considering and if thought fit of passing the following resolution :

That the conditional offer made by the President to and accepted by the Government of Bengal for the transfer to the Government of India of the right, title and interest of this Society in the Metcalfe Hall property, in consideration of a perpetual annuity of Rs. 6,000 unfettered by any conditions affecting its enjoyment and a sum of Rs. 25,000 in cash be and is hereby adopted and confirmed, and that the President be and he is hereby authorised to carry such transfer into effect, and to transact any other business that may be brought forward thereat.

Dated this 14th day of March, 1900.

(Signed.) W. D. Cruickshank.
(,,) Joy Gobind Law.
(,,) Peary Mohun Mookerjee.
(,,) Prosonno Coomar Bannerjee.
(,,) Pratapa Chandra Ghosha.
(,,) E. J. King.

Notices of Motion.—Mr. H. C. Eggar moved the following notice of motion for the Special General Meeting to be held on Friday, the 27th day of April, 1900.

That the conditional offer made by the President to and accepted by the Government of Bengal for the transfer to the Government of India of the right, title and interest of this Society in the Metcalfe Hall property in consideration of a perpetual annuity of Rs. 6,000, unfettered by any conditions affecting its enjoyment, and a sum of Rs. 25,000 in cash, be and is hereby adopted and confirmed, and that the President be and he is hereby authorised to carry such transfer into effect.

H. C. Eggar, Mover.
14th March, 1900.

The Bye-Laws.—Read following letter from Raja Peary Mohun Mukerjee, C.S.I.

To The President of the Agri.-Horticul. Society of India.

Sir,—I beg to give notice that I shall move at the next Special General Meeting of the Society to be held on the 27th Aprial next, the undermentioned resolution.

That a Sub-Committee consisting of three members of the Council be appointed for the purpose of examining the Rules of the Society and suggesting amendments therein.

Peary Mohun Mookerjee, Mover.
14th March 1900.

It was directed that the minutes of this meeting be posted to Mofussil members in order that they may have the privilege of voting on the questions, sending their votes, post paid to the Secretary not later than the 27th April, 1900, for record in terms of Section 8, Chapter XI. of the Bye-Laws.

The following letter was addressed to Mofussil members with extract of the Meeting :—

AGRICULTURAL AND HORTICULTURAL SOCIETY OF INDIA.

METCALFE HALL,

Calcutta, 20th March, 1900.

DEAR SIR,

You will remember that at a Special General Meeting of the Society held on 17th May last year, a proposal made by His Honor the Lieutenant-Governor of Bengal on behalf of the Government of India for the transfer of the rights and interest of the Society in the Metcalfe Hall in furtherance of His Excellency the Viceroy's scheme for the constitution of an Imperial Library was considered, and a resolution rejecting the proposal was carried by a majority of 22 votes of the 206 recorded. The resolution was communicated to Government.

The proposal shortly stated was as follows :—

(1). That Government should erect a suitable building for the use of the Society on their grounds at Alipur.

(2). That Government should pay off the amount owing by the Society on mortgage estimated to amount to Rs. 12,000.

(3). That if the proposals 1, and 2, should be accepted Government should continue its so-called donation of Rs. 6,000, so long as the Society should continue to carry into effect the objects for which it was created, and should continue with the aid of the donation to be solvent.

The continuation of the donation was also to be subject to the fulfilment of the conditions originally attached thereto.

The main considerations which influenced the passing of the resolution were, that it was inadvisable in the interests of the Society to invest any portion of the compensation to be received in the erection of a house on their grounds at Alipur for the reasons, (1) that having regard to the conditions on which the land at Alipur is held to the litigation threatened in respect of such land and other surrounding property, and to the practical requirements of the Society, the application of the compensation to the building of a substantial house at Alipur would not be desirable as an investment, and (2) that the compensation to be received might be otherwise more advantageously employed to yield an income.

As to the continuation of the so-called donation of Rs. 6,000 a year it was suggested that the term donation did not correctly describe the nature of the annual payment by Government; that the more accurate description would be a payment made as remuneration for services to be rendered by the Society to Government, and that the annual payment was based on a consideration distinct from the acquisition of the rights of the Society in the Metcalfe Hall, and was conterminous with the contractual relations between the Society and Government.

It was considered that the proposal as to the continuation of the payment amounted to this, that the Government should continue to be entitled to the performance by the Society of their contractual obligations and at the same time that the Society should, without any cessation of those obligations, surrender the remuneration in order that it might be applied to a different object, and be subjected to other and less favourable conditions.

The matter remained in abeyance until February last when the President was asked by the Government of Bengal if he

could give an idea as to what, in his opinion, the Society would be prepared to accept for their rights in the Metcalfe Hall.

After consulting with members of Council the President replied that in his opinion the Society would accept a perpetual annuity of Rs. 6,000 unfettered by any conditions, and a sum of Rs. 25,000 in cash. This conditional offer has been accepted by the Government of Bengal.

This annuity of Rs. 6,000 is distinct from the annual payment of Rs. 6,000 which will be paid for the financial year 1900-1901. The continuation of this payment in full or in part, will depend on circumstances, and upon the amount of scientific, economic or experimental work required of the Society by Government, the Society being remunerated according to services to be rendered.

The terms now under consideration were considered and unanimously adopted by the Council of the Society at their meeting on the 9th current, and at the Annual General Meeting, on the 14th instant, notice was given that the following resolution would be moved at a special General Meeting convened for the 27th ultimo. "That the conditional" "offer made by the President to, and accepted by the" "Government of Bengal for the transfer to the Govern-" "ment of India of the right, title, and interest of the Society" "in the Metcalfe Hall property in consideration of a per-" "petual annuity of Rs. 6,000 unfetterred by any con-" "ditions affecting its enjoyment and a sum of Rs. 25,000" "in cash be, and is hereby adopted and confirmed, and" "that the President be, and he is hereby authorised to" "carry such transfer into effect."

I have to solicit the favour of your recording your assent to the resolution, or dissent therefrom on the voting form

annexed, which should be signed by you at foot and returned post-paid so as to reach me not later than the 27th April next.

Yours faithfully,
P. LANCASTER,
Secretary.

VOTING PAPER.

Agricultural and Horticultural Society of India.

Resolution :—"That the conditional offer made by the President to, and accepted by the Government of Bengal, for the transfer to the Government of India of the right, title, and interest of this Society in the Metcalfe Hall property, in consideration of a perpetual annuity of Rs. 6,000 unfettered by any conditions affecting its enjoyment, and a sum of Rs. 25,000 in cash be, and is hereby adopted and confirmed, and that the President be, and he is hereby authorized to carry such transfer into effect."

Name of Member.	Vote Given.	
	For	Against.

*Dated*_____*1900.* *Signature of Member.*

Sansevieria fibres.

MOZUFFERPUR,
5th March, 1900.

THE SECRETARY, AGRI.-HORTICULTURAL SOCIETY, CALCUTTA.

DEAR SIR,

The accompanying pamphlets may be of interest to readers of your Proceedings, and I shall be obliged by your embodying it in your next issue.

Yours faithfully,
A. C. BLECHYNDEN.
KUTCHI-SERAI P. O.,
MOZUFFERPUR, T. S. RAILWAY,
5th March, 1900.

THE SECRETARY, AGRI.-HORTICULTURAL SOCIETY,
METCALFE HALL,
CALCUTTA.

DEAR SIR,

Owing to enquiries, and the interest shown by Planters with a view to cultivating fibre producing plants, I have been led to gather information, as to cultivation and price obtainable—for the different varieties of *Sansevieria*, especially of the two kinds *S. zeylanica*, and *S. guineensis* commercially known as "*Bow string*," and "Konge" hemp; both thrive well in Behar.

The accompanying pamphlet, extracts from Roxburgh and Balfour and copy of Mr. Hooper's letter are worth careful reading. The figures work out a handsome margin of profit.

I am prepared to supply rooted plants on the following terms :—

		Per pucca maund.
S. zeylanica	Rs.	9 8 0
S. guineensis	,,	12 0 0

delivered at Howrah, or at your Agent's Godowns, and exclusive of packing charges. Cash on delivery, cheques to made payable to order.

I have small quantities of both varieties now growing in the district, which are thriving well with very little attention. It is a plant of hardy constitution, and will grow on a poor quality of land which has not hitherto paid to bring under cultivation. Doctor George Watt, C.I.E., observes (page 6 of pamphlet) that if fragments of the leaves are scattered over the soil each fragment takes root rapidly, and a good crop is yielded in a very short time. This has been tried by me but did not prove successful. I advocate putting down strongly rooted plants only. The following planting table will afford the necessary information as to number of plants, approximate weight, and price per beegha and per acre. 2′ × 2′ apart, is a convenient distance to plant out.

PLANTING TABLE.

Distance apart.	Number of plants required.	Approximate Weight.	Cost at Rs. 9-8-0 per md.	Cost at Rs. 12-0-0 per md.	Acre.	Beegha (6½ haths.)
1′-6″..1′-6″	19,360	Md. 37-0-0	Rs. 351-8-0	Rs. 444-0-0	1-0-0	..
,, ,,	16,900	,, 33-0-0	,, 313-0-0	,, 369-0-0	..	1-0-0
2′-0″..2′-0″	10,199	,, 21-0-0	,, 199-8-0	,, 252-0-0	1-0-0	..
,, ,,	9,514	,, 18-0-0	,, 171-0-0	,, 216-0-0	..	1-0-0

Any time of the year is suitable for planting in Behar, except very hot droughty weather. A light gathering can be counted on, at the end of twelve months; after this two gatherings in the year.

Full particulars of Lehmann's & Death and Harris' fibre cleaning machines can be procured through Messrs. T. E. Thomson & Co., "Limited," of Calcutta.

It is recommended to those desirous of giving this fibre a fair practical trial, with a small initial outlay, that a Lehmann's extractor worked by hand power be procured. This machine is capable of turning out lbs. 150 of cleaned fibre per 12 hours. To convey some idea as to initial cost, working expenses, and probable profits that might be reasonably expected, the following estimate has been drawn up based on a cultivation of 5 Beeghas with but "one cutting" at the end of 12 months. The plant being a perennial, will not require renewing, and two annual "cuttings" can be made after the first year of planting out. To arrive at probable net profits from the second year, the estimated working expenses, despatching, and incidental charges and gross proceeds, should be doubled. The initial expenses, or original capital, would of course remain the same. The estimate I consider has been drawn up with an ample margin.

I shall be glad to afford any other information which may be at my disposal.

Yours faithfully.

A. C. Blechynden.

Estimate for a Cultivation of 5 Beeghas of Sansevieria, one Cutting, or Gathering.

	Rs.	A.	P.	Rs.	A.	P.
Initial Expenses.				1,667	8	0
1 Lehman's hand power Extractor Rs. 480-0-0 net, plus freightage, and incidental charges (say) ...	600	0	0			
Cost of plants, sufficient to plant out 5 beeghas	1,067	8	0			
Mds. 45 S. zeylanica at Rs. 9-8-0 per md.	427	8	0			
Mds. 44 S. guineensis at Rs. 12-0-0 per md.	540	0	0			
	967	8	0			
Estimated freightage and packing charges	100	0	0			
Working Expenses	.....			225	0	0
3 Carts at annas 5 per day working 37 days	34	11	0			
12 men cutting and gathering at Rs. 3-0-0 per month each man for 37 days	45	0	0			
5 men working machine at Rs. 4-0-0 per month each man for 37 days	25	0	0			
	104	11	0			
Railway, and steamer freight, incidental, and all other expenses ...	120	5	0			
			Total ...	1,892	8	0

Note.—Yield of dry fibre from one cutting at end of 12 months equal to mds. 13·25 per beegha or 13·25 × 5 equal to mds. 68·5 (about 2½ tons from 5 beeghas

	£	*s.*	*d.*			
Gross Proceeds				843	12	0
1¼ tons S. zeylanica at £20-0-0 per ton equal to ..	25	0	0			
1¼ tons S. guineensis at £25-0-0 per ton equal to...	31	5	0			
Total ...	56	5	0			
£56-5-0 at £0-1-4 exchange equal to Rs. 843-12-0 carried out.						
Less—**Working Expenses**				225	0	0
Estimated probable net profit which is about 37 per cent. on Initial expense or Capital invested... } BALANCE ..				618	12	0

COPY.

Reporter of Economic Products
Government of India.

INDIAN MUSEUM.
1 SUDDER STREET,
Calcutta 7th October, 1899.

Dear Sir,

I am sending you a few particulars of the cultivation of Bow-string hemp. In reading more carefully through Dr. Morris' lecture on fibres, I notice that the leaves of *Sansevieria zeylanica* are smaller, and there is a greater difficulty in handling them than other species, and he does not consider it the best plant for affording commercial fibre, but in this respect he alludes only to the hand made article.

Konge Hemp. *S. guineensis* grows well in Jamaica and under favourable circumstances yields 1½ ton per acre of cleaned fibre, valued at £45. Good machine fibre from Cuba is said to have realized £50 per ton.

Fibre from the Central Africa Protectorate in 1897, was worth £40 per ton.

S. longiflora leaves of equatorial Africa, yielded a fibre in 1897, which sold for £30 per ton. Panjane Hemp. *S. Kirkii* a long leaved kind from Zanzibar was valued at price left out. *S. cylindrica* of South Africa affords a valuable fibre, at £28 per ton. *S. sulcata,* a slenderer plant with a weaker fibre, gave a product worth £26.

It seems that the machine cleaned article is the best for an European market, and if the *zeylanica* plant were cultivated on suitable soil it would afford a satisfactory staple.

The plant should not be grown in too arid a district, or in soils strongly impregnated with salt, as these conditions impoverish the growth.

The propagation may be made by dividing the underground stem or rhizome, but plants may also be raised by seed, or from the leaves which latter planted whole, or cut into small pieces readily take root in moist situations. If I should have any further information as to the market price of Bow-string hemp I will send it to you.

Yours faithfully,

(Sd.) D. HOOPER.

EXTRACTS.

"In a good soil, when the plants are regularly and moderately watered, the leaves grow to be from three to four feet long, and contain a number of fine, remarkably strong, white fibres, which run their whole length. The natives make their best bow strings of these fibres. To separate them from the pulpy parts, they lay a single fleshy leaf, on a smooth bit of board, on one end of which (leaf) they place one of their great toes, and with a thin bit of hard stick held between the two hands, they scrape the leaf from them, and very quickly remove every part of the pulp. It can also be removed by steeping the leaves in water, till the pulpy parts rot, &c., as is practised with flax, and hemp in Europe, but with me this discoloured the fibres much.

"About 80 lbs. of the fresh leaves yielded one pound of the clean dry fibres. These were gathered at once from a small bed of the plants which I planted about 12 months before in my own garden. The bed was scarcely 3 yards square and the leaves upon an average less then two feet long, owing to my having gathered them before they were at their full size. Full grown leaves of three or three and a half feet long yielded in the proportion of one pound of the clean fibres (flax,) for every 40 lbs. of fresh leaves, for 8 lbs. of such leaves, yielded me three ounces of clean fibre;

hence I conclude that this plant might be cultivated to advantage. For even according to the first mentioned rate, of one pound of the fibres, from a bed of 3 square yards of the plants one acre would yield 1,613 lbs. of the clean flax at a gathering, two of which may be reckoned on yearly, in a good soil, and a favourable season after the plants are of a proper age, mine being only as yet about 12 months old, which I imagine is too short a time for them to have acquired sufficient size and strength to yield the best and largest proportion of fibre.

"There are certainly a great variety of uses to which these fibres may be applied, better than any other substance yet known. I am inclined to think that the fine line called China grass, which is employed for *fishing lines, fiddle strings, &c.,* is made of these fibres.

"It grows readily from the slip, which issue in great abundance from the roots, requires little or no care, and as they are perennial, would not require renewing often, if at all; indeed the bed in my garden requires thinning.

"Some years ago, I remember to have seen a bed or two of these plants in Dr. Russell's garden at Vizagapatam, which grew most luxuriantly, more so than mine has done; which gives reason to think that a rich sandy soil may suit this plant better than our stiffer soil about Samulcota. Should it ever become an object of culture, a less expensive and more expeditious method of clearing the fibres from the pulpy parts of the leaves, than that of the native's above-mentioned, must be contrived; for as they now do it, that alone would involve a greater expense than every other charge."—(*Dr. W. Roxburgh.*)

"It resembles the Agave in some of its characters, but produces finer fibres, which are easily separated from the

pulp and have been long known as a useful material for cordage, being soft, silky, and pliant when well prepared; about equal to the Agave fibre in point of strength; but as a finer material, it might be applied to a better description of manufactures. The plant is easily propagated, and yields a good crop under cultivation. It was tried against Russian hemp on board the "*Thalia*" East Indiaman, when commanded by Captain Biden, and was highly approved of. It has also been made into fine cloth, thread, twine, rope; and cords are made from this fibre."—(Surg.-Genl. Ed. Balfour.)

(*Vegetable Product Series, No. 27.*)

(*Fibres.*)

THE AGRICULTURAL LEDGER.

1896—No. 30.

SANSEVIERIA ZEYLANICA.

(Bow-string Hemp.)

[*Dictionary of Economic Products, Vol. VI., Pt. II.*, S. 785.]

Murva Fibre as a Second or Catch Crop for Tea Planters.

Result of Examination of a sample forwarded to the Imperial Institute; Commercial Valuations obtained thereon; together with Review of the Corespondence by the editor; *and a Note on Cultivation by a West Indian Planter. To which is prefixed an Account of the Plant and mode of preparing the fibre.*

The object of the inquiry indicated in the correspondence herein briefly reviewed is to discover a plant that might be profitably grown as a second or catch crop on those portions of Tea Estates not required, or not suitable for tea. It is universally admitted that such a crop is much needed. Considerable attention has of late been given to the subject

with the result that *Murva* fibre (*Sansevieria zeylanica*), or as it is known in trade, Bow-string Hemp, may possibly come to be so cultivated.

The correspondence under review may be suitably prefaced by the following account of the plant and its fibre taken from *The Dictionary of Economic Products.*

The Bow-string Hemp (*Sansevieria zeylanica*) plant is a stemless bush with perennial roots, and a rosette of six to eight succulent, radical leaves, the inner of which are often four feet long, and end in a long straight spine, the scape or peduncle, one to two feet long, rising from the centre of the leaves. Flowers racemose, greenish-white, erect, four to six together in clusters. It is found on the eastern coast of India from Bengal to Madras; common on the Coromandel coast, in Cumbum, and in the Dindigul district. It is stated that in Malabar, of which country it is a native, it does not produce seed. In India it may be said to exist under cultivation mainly. It is distributed to Ceylon, Java, and the coasts of China and Africa.

From the succulent leaves is extracted a fibre held in high esteem by the natives on account of its elasticity and consequent suitableness for bow-strings. . . . The fibre is used for the preparation of cordage and matting in the regions where it occurs, and is much valued in Europe for ropes used in deep sea dredgings . . .

The fibre is pliant, soft, and silky, and much resembles that of the pine-apple. It is usually prepared by taking the fresh leaves and placing one of them on a smooth board which is raised at one end. The lower end of the leaf is then pressed down by the toe of the workman, who squats on the plank, and with a blunt knife or piece of iron plate scrapes upwards along the surface of the leaf and thus

deprives it of its fleshy pulp by successive scrapings, turning the leaf over and over, as may be necessary. When the pulp is thoroughly removed, the fibre is washed for three or four minutes, and dried in the shade. Washing in brackish or salt water, or continuous soaking in water, is said to destroy the glossy white appearance of the fibre. With reference to the strength of *Murva* fibre Dr. Royle made some comparative experiments with this and Agave fibre, which showed that the two were about equal in strength. . . The thread made from *Murva* fibre is sometimes woven into fine cloths, which readily take on various dyes.

On the 20th December, 1895 (letter No. 1880), the Reporter on Economic Products forwarded to Mr. Royle, Curator, Indian Section, Imperial Institute, a small quantity of Bow-string Hemp or *Murva* (*Sansevieria zeylanica*) fibre. This had been received from Honourable Mr. J. Buckingham, C.I.E., of Amguri, Assam, through his Calcutta Agents, Messrs. Begg, Dunlop & Co. The covering letter to Mr. Royle stated that tea planters were anxious to have an auxiliary crop, and asked that a valuation of the sample might be obtained at an early date. The letter concluded by saying that if the report proved encouraging, endeavours would be made to procure a large parcel so as to allow of a practical test. Also that any suggestions as to methods of separation of the fibre, defects of present sample, etc., would be highly appreciated. About the same time the Reporter in a letter to Mr. H. C. Begg of Messrs. Begg, Dunlop & Co., wrote :—I saw the plant growing while I was in Assam. Nothing could be simpler than the system of cultivation and method of separation of the fibre. If the price offered for it should leave a reasonable profit over and above expenses involved, I am disposed to regard this as by far the most promising auxiliary crop which the Assam

planters could find. If the Honourable Mr. Buckingham could send me a much larger sample, it would be possible to obtain a definite valuation.

Reply was duly received from Mr. Royle, who forwarded the appended reports kindly obtained by him on the sample refered to :—

From J. H. Christie, Esq., *to* J. Royle, Esq., c.i.e., *Curator, Indian Section, Imperial Institute,—dated 72, Mark Lane, London, E. C., 27th January, 1896.*

Yours of 24th and sample of Sansevieria to hand. We value £16-17 per ton ; but had colour been bright white instead of yellow, we should have put same £20 per ton. This fibre will sell easily ; we shall be glad to see a trial shipment of 20 or 30 tons. The cleaning is perfect and cannot be improved.

From C. E. Collyer, Esq., *to* J. R. Royle, Esq., c.i.e., *Curator, Indian Section, Imperial Institute,—dated 155, Fenchurch Street, E. C., 23rd January, 1896.*

I have examined the sample of fibre described as "Bowstring Hemp," *Sansevieria zeylanica.* This specimen is inferior to the fibre obtained from the usual growths of *Sansevieria zeylanica.* It is less fine, more variable in strength, partly weak and brittle and of poor colour—these defects may possibly be owing to the fibre being over ripe or from old stems—as it is it is too much like some of the Aloe fibres to realise its intrinsic value, and in the condition of this specimen it would not in the present low markets realise more than about £20 per ton in London, but when more carefully prepared and of the usual good strength and colour the value would probably be £25 per ton and upwards. A few tons carefully prepared should be sent to test the market.

From C. E. COLLYER, Esq., *to* J. R. ROYLE, Esq, C.I.E., *Carator, Indian Section, Imperial Institute,—dated 155, Fenchurch Street, E. C., 24th January 1896.*

In continuance of my Report on the *Sansevieria zeylanica* fibre, and in reply to your questions of the 21st instant. The quality of the fibre would be much improved by the use of suitable decorticating machines and so far as any fibre has come to market the best results have been from the improved "W. E. Death" machine which turns out about 6 cwt. per day of cleaned fibre at a cost at least as small as by any other system. Soil and climate have much to do with the quality of the fibre and also to have the right variety for fibre purposes of the *Sansevieria zeylanica*. The fibre may be packed in bales of about 3 cwt. each, moderately pressed; each head (or small bundle) tied round near the butt end with some of the fibre—the fibre must not be knotted or plaited but packed straight, to preserve the fibre from being discoloured; the fibre to be perfectly dry before packing.

From MESSRS. SLANN & DAVIS, *to* J. R. ROYLE, Esq., C.I.E., *Curator, Indian Section, Imperial Institute,—dated 51 and 52, Fenchurch Street, E. C., 29th January 1896.*

In reply to yours of 24th instant (which we regret we have not replied to before), we have examined the sample of fibre you sent us and find this very similar to Aloe fibre, fair colour, good strength. We should value same at about £18 per ton up, we might even get as much as £20, but this is very uncertain in the present state of the market. Prices are at present lower than they have been for many years, but there is every prospect of an improvement before long, as the low prices have stopped the production of certain hemp (New Zealand, etc.) and Manila is very firm

now with every prospect of higher prices. Of course it is very difficult to give an exact valuation on the small sample sent us; we would recommend you to get your friends to ship, say, 10 bales, when we should be pleased to give the fibre a fair trial.

The Honourable J. Buckingham, C.I.E., through Messrs. Begg, Dunlop & Co., informed the Reporter that he regretted he would not just yet be able to furnish a large quantity, but that he was extending the cultivation of the fibre as quickly as possible. Mr. Royle was accordingly informed (letter No. 1227—76, dated 29th April 1896,) that some delay might be expected before a large supply of the fibre could be produced. Copies of the correspondence and of the foregoing reports were then handed to Messrs, Begg, Dunlop & Co. by the Reporter with a letter No. 951—76, dated the 2nd April 1896. In that letter the Reporter mentioned that a few tons of the fibre were required as an experimental consignment to test the market, and also for complete investigation by the Research Department of the Imperial Institute, The Reporter accordingly requested to be informed whether Messrs. Begg, Dunlop & Co. would be prepared to entertain the idea, and added :—"It would seem desirable that you should go the length of purchasing a machine suitable for cleaning the fibre, and one of my correspondents, it will be observed, has suggested the one that is considered most suitable." The Reporter further stated that the Honourable Mr. Buckingham's discovery of the suitability of this fibre plant to the conditions of many of the waste lands of the tea districts was probably one of considerable value. That he had recently been urging to the attention of planters the claims of Rhea fibre for that purpose. There could be not doubt that there was room for both fibres, and that some districts might find the

Bow-string Hemp more convenient and equally profitable to Rhea. These were fibres that would meet independent demands, and could never enter into competition. It had been suggested that *Sansevieria Roxburghiana* might be found a better species than *S. zeylanica*. Before direct steps were taken to lay out a plantation, experiments might be made on a small scale side by side with authentically named rooted plants of both forms. Very possibly these could be supplied by the Superintendent, Botanic Garden, Sibpur.

The Honourable Mr. J. Buckingham, C.I.E., wrote under date 28th April 1896, through Messrs. Begg, Dunlop & Co.: "It is very satisfactory to find the fibre so well spoken of, but it is quite impossible for me as yet to get any large quantity of it. It appears to me that the best thing I can do is to extend the cultivation of this fibre at first to about 5 acres, and then see what that area is capable of producing. I have enough at present (starting from a single plant only) to put out about one acre, and all the available shoots I am now cutting up and planting out."

The following Report on the sample in question was kindly furnished by Sir Frederick Abel, Bart., K.C.B., with Flying Seal letter No. 92, dated 11th June, 1896. This Report gives the comparative results of examination of the fibre obtained in the Research Department of the Imperial Institute.

REPORT ON SANSEVIERIA ZEYLANCIA FIBRE.

The fibre of this plant, which belongs to the natural order LILIACEAE is of a beautiful light colour and fine gloss. The staple is about four feet in length, of smooth well-formed threads.

The sample was obtained from Amguri in Assam, where Dr. George Watt, C.I.E., Reporter on Economic Products,

observed that is was being grown upon waste land by a tea planter. Dr. Watt states that the plant can be grown without cultivation; if fragments of the leaves are scattered over the soil, each fragment takes root rapidly, and a good crop is yielded in a very short time. *

Chemical examination shews this fibre to be of high quality. Mr. Cross (a member of the Committee of Advice) examined a sample of Sansevieria which was included in the collection at the Indian and Colonial Exhibition, and also tested its paper-making qualities; the chemical results obtained by him shewed that the specimen he examined was inferior in quality to the present sample. *(Report on Indian Fibres, 1886.)*

The following are the results furnished by the two samples:—

Sansevieria zeylanica.	Assam.	From Colonial and Indian Exhibition.†
Moisture °/₀	9·4	9·7
Ash °/₀	0·7	...
Loss by A. hydrolysis °/₀ .	11·8	12·
Loss by B. hydrolysis °/₀ .	14.9	16·5
Loss by mercerising °/₀ .	11·6	...
Loss by acid purification °/₀ .	1·4	2·5
Gain by nitration °/₀ . .	33·5	6·0
Cellulose °/₀	75·6	64·6
Length of ultimate fibre in mms.	1·5—3·5	1·5—2·5

With the exception of the results of chemical examination obtained in the Scientific Department of the Imperial Institute, there are very few available for purposes of general comparison of monocotyledonous fibres. Reports on twenty-one different species have from time to time been published in the Institute Journal. Many of the fibres dealt with in these reports were obtained, it is true, from plants which were not indigenous to the locality they were

* This experiment has been tried several times at the Society's Gardens, but without success. The only successful methods have been division of the rhizome and sowing of seed.

† (Report on Indian Fibres.)

grown in. Special care, however, had been taken in the cultivation and treatment, so that the fibre which they furnished was probably little inferior to the same kind of fibre derived from the wild plants grown in their natural habitat. Accepting the results which they furnished as suitable for purposes of general comparison, it appears that the "cellulose" numbers furnished by fibres of monocotyledonous origin range from about 61 to 77, the average number being about 70. The "nitration" numbers range from 9 to 34, with an average of about 20.

Sansevieria, which furnishes the numbers 75 and 33, respectively, therefore ranks high among these fibres. Again, the A. and B. "hydrolysis" numbers, and especially the difference between them, are of special significance. The Victorian monocotyledonous fibres may indeed be classified from this point of view (see Victoria-grown fibres, Imperial Institute Journal). Thus, the approximate A. and B. hydrolysis numbers and the differences are, respectively, for the Cordylines:—15, 19 and 4: for the Agaves:—16, 21 and 5: for the Kniphofias:—17½, 23 and 6.

Sansevieria furnishes the numbers 12, 15 and 3. These would indicate that it should possess special powers of resistance to weathering and the accompanying hydrolytic effects. The general results of chemical examination of this fibre may be considered as very satisfactory. A comparative statement of the results furnished by the monocotyledonous fibres, showing the relation of Sansevieria thereto, is appended:—

	A. Hydrolysis. No.	B. Hydrolysis, No.	Difference.	Cellulose. No.	Nitration. No.
Cordylines . .	15	19	4	68½	18
Agaves . . .	16	21	5	75½	19
Kniphofias . .	17½	23	6	71	29
General range .	10—18	20—30	10	61—77	9—34
Sansevieria zeylanica	12	15	3	75½	33

The reports of experts on this sample of Sansevieria were favourable, although it exhibited some trifling defects due, probably, to the degree of maturity of the plant from which it was prepared. A supply of several tons has been asked for, with a view to submit it to practical trials.

———o———

Note on the Cultivation of Sansevieria zeylanica, by a West Indian Planter.*

The plant grows best in a moderate shade in black soil, the cultivation is *easy* from either cutting from stems or from roots, the plants should be about 18 inches apart and 18 inches between the rows, the soil should be moist but not too wet, and the growth is much more rapid under shade than in the hot sun, and the quality of the fibre is better. The plants are usually ready for cutting in from 9-12 months and may be cut at any season, *except after a long drought*, when the fibre is apt to be harsh and tender. The plants attain nearly double the height in black soil and shade compared with the red soil in the sun, and the fibre of the freely growing plant is naturally much superior.

Sansevieria zeylanica. The following references are also given :—'*The Flora of British India. J. D. Hooker. Vol. VI. 1894.*) Ceylon ?—Distributed ? Tropical Africa. *Leaves* 1-1½ in. broad at the base, very thickly fleshy and hard, margins scarious. *Scape* 1-2 ft., with distant scarious sheaths ; bracts ⅓ in. long ; pedicels short ; perianth 1½ in. diam. The above description accords with Baker's, and with the plant figured in the Botanical Register, of which the origin is uncertain, but which has long been cultivated as a native of Ceylon. It is stated to inhabit also Tropical and South Africa ; which is more probably its native country.

* Furnished by J. R. Royle, Esq , C.I.E.

S. Roxburghiana. Coromandel Coast. *Roxburgh.* According to Roxburgh's drawing (at Kew) this is a very different species from *S. zeylanica*, with fewer very much longer and much narrower leaves reaching 4 ft. in length, 1 in. broad, narrow at the base and not nearly so deeply channelled : the scape is more slender with few narrowly lanceolate sheaths, the raceme much longer and the flowers smaller. Whether it is Rheede's XI. 43, which grows in sandy places on the Malabar coast, is doubtful. Roxburgh describes it as cultivated for its fibre, I suspect that it is the only species indigenous to India and is confined to the Western Peninsula and Ceylon, wild or cultivated.

S. Zeylanica. (Dictionary of the Economic Products of India, Watt, Vol. VI Part II.) Syn.—It seems doubtful if the India plant (*S. Roxburghiana. Shult.*) should be received as the same as that met with in Ceylon or distinct (Sir J. D. Hooker, in the forthcoming volume of the *Flora of British India*) appears to regard it as distinct, and as possibly indigenous to India, but confined to the Western Peninsula and Ceylon. Roxburgh speaks of it as cultivated for fibre. For all practical purposes both species may be regarded as one and the same, and as of equal value for their fibres.

Habitat.—A stemless bush, with perennial roots, and a rosette of six to eight succulent, radical leaves, the inner ones of which are often 4 feet long and end in a straight long spine, the scape 1 to 2 feet long. rising from the centre of the leaves . . . It is found on the eastern coast of India from Bengal to Madras ; common on the Coromandel coast, in Cumbum, and in the Dindigul District . . . . In India it may be said to exist under cultivation mainly. It is distributed to Ceylon, Java, and the coasts of China and Africa.

Fibre.—From the succulent leaves is extracted a fibre, held in high esteem by the natives on account of its elasticity and consequent suitableness for bow strings . . . . It is in fact easily cultivated. The fibre is used for the preparation of cordage and matting in the regions where it occurs, it is much valued in Europe for ropes used in deep-sea dredgings. In Trichinopoly it is employed for the manufacture of paper; but was reported on by Messrs. Cross, Bevan, King and Watt as too expensive for the paper-maker, except for very special paper . . . . With reference to the strength of *Murva* fibre Dr. Royle made some comparative experiments with this and Agave fibre which showed that the two were about equal in strength. A series of comparative experiments was made in 1838 by the Marine Board of the East India Company, who reported that "it was not equal in strength to" "the Europe or Manilla hemp, but that it seemed to take hot" "tar as well as the latter, and would answer generally for" "the same purposes as those to which the Europe and" "Manilla cordage is applied." In a further report it was stated that 40 maunds of the fresh plants produced one maund of fibre. The expenses, however, of the experiment were high, and the best methods of separating the fibre had not been followed.

S. zeylanica. (Useful plants of India, Drury, 1858.) Regarding the comparative strength of Moorva fibre, Dr. Roxburgh had a line four feet long which bore a weight of 120 lbs. a cord of similar size made of Russian Hemp breaking at 105. In other experiments the fibre in an untwisted state bore 280 lbs., and Agave fibre only 270.

Samples of S. trifasciata and S. cylindrica cleaned by Faure's Rhea cleaning machine were laid on the table, the former produced lengthy fibre, $3\frac{1}{2}$ feet, but in comparison with the latter, its strength appeared to be greatly less. *S.*

cylindrica is easily and perfectly cleaned by the above machine, whereas the flat leaved species do not pass the blades at all evenly, and large patches of flesh remain attached to the fibre.

Paspalum dilatatum. A large number of letters and requests for seeds and roots of this fodder grass have been received within the last two months. Attempts have been made to procure seeds from various parts of the world but without success, a consignment of roots, however, to be shipped in Wardian cases has been applied for and it is expected that the grass will be received here in June, when it will be propagated and supplied as rapidly as possible.

LIST OF MEMBERS

OF THE

Agricultural & Horticultural Society of India.

DECEMBER 31st, 1899.

ALPHABETICALLY ARRANGED, CLASSIFIED,

AND

DISTINGUISHING THE YEAR OF ADMISSION.

AGRICULTURAL AND HORTICULTURAL SOCIETY OF INDIA.

The Ordinary Monthly Meeting held at the Metcalfe Hall on Wednesday, the 13th June, 1900 at 4-30 p.m.

Present :

BABU JOY GOBIND LAW, C.I.E., *in the Chair.*

Mr. C. M. LANCASTER. | MR. P. LANCASTER, *Secretary.*

The Minutes of the last Meeting, held on the 14th March, 1900, were read and confirmed.

The following were proposed and elected Ordinary Members :—

Mr. B. C. Sen, I.C.S., Officiating Collector, Bogra, proposed by Mr. J. H. E. Garrett, I.C.S., seconded by Babu Joy Gobind Law, C.I.E.

Mr. N. G. Cholmely, I.C.S., Deputy Commissioner, Bhamo, proposed by Mr. C. M. Lancaster, seconded by Babu Joy Gobind Law, C.I.E.

Mr. A. A. Apcar, 11, Russell Street, proposed by Mr. E. J. King, seconded by Mr. C. M. Lancaster.

Munshi Mahomed Ishaq, Bankipur, proposed by Babu Joy Gobind Law, C.I.E., seconded by Mr. C. M. Lancaster.

Mr. K. H. Stephen, C.E., Cuttack, proposed by Mr. E. J. King, seconded by Babu Joy Gobind Law, C.I.E.

The President, Government Agri-Horticultural Garden, Lahore, proposed by Mr. P. Lancaster, seconded by Mr. C. M. Lancaster.

Mr. Saroda Churn Mitra, Vakil, High Court, proposed by Raja Peary Mohun Mukerjee, C.S.I., seconded by Mr. C. M. Lancaster.

Mr. John Nicol, 15, Clive Row, proposed by Mr. E. J. King, seconded by Babu Joy Gobind Law, C.I.E.

Mr. A. Ashfield, Behubur Co., Ld., Nazira, Assam, proposed by Mr. P. Lancaster, seconded by Babu Joy Gobind Law, C.I.E.

Mr. A. Ripley-Bean, Meja Road, E. I. R., proposed by Mr. P. Lancaster, seconded by Babu Joy Gobind Law, C.I.E.

Mr. J. Cowie, Darbhanga, proposed by Mr. P. Lancaster, seconded by Joy Gobind Law, C.I.E.

The Deputy Commissioner, Sonthal Parganas, Nya Dumka, proposed by Babu Joy Gobind Law, C.I.E., seconded by Mr. P. Lancaster.

Mr. Dhirendra Nath Dutt, 139, Cornwallis Street, proposed by Mr. E. J. King, seconded by Mr. P. Lancaster.

The Chairman, Gauhati Municipality, proposed by Mr. C. M. Lancaster, seconded by Babu Joy Gobind Law, C.I.E.

The Revd. E. M. Haddow, Cinnamara, Assam, proposed by Mr. C. T. Jessop, seconded by Mr. P. Lancaster.

Lieut. W. H. Cox, I.M.S., Nowgong, Bundelkhand, proposed by Mr. P. Lancaster, seconded by Babu Joy Gobind Law, C.I.E.

Mr. W. H. Stevens, 52-3, Park Street, proposed by Mr. P. Lancaster, seconded by Babu Joy Gobind Law, C.I.E.

Mr. L. P. Shirres, I.C.S., Bhagulpur, proposed by Capt. C. R. Stevens, I.M.S., seconded by Babu Joy Gobind Law, C.I.E.

PRESENTATIONS.

The Superintendent, Raj Darbhanga Gardens, Darbhanga.
One packet Kentia Macarthurii.

The Superintendent, Government Agri-Horticultural Gardens, Lahore.—
Two packets of seeds.

Mr. G. Girard, Guseri, Calcutta—
One packet Stephanotis floribunda.

The Director, Botanical Station, Jamaica—
Nine packets of seeds.

The Government Botanist, Natal—
Twenty-three packets of seeds.

The Government Botanist, Melbourne—
Three packets of seeds.

Mr. H. C. Eggar, Alipur—
Two Combretum densiflorum.

Mr. G. Rogers, Darjiling—
Two packets of seeds.

Mr. C. H. DeMello, Arrah, E. I. R.
One hundred and eighty-seven plants.

The Superintendent, Agri-Horticultural Society's Garden, Madras.
Two packets of seeds.

Mr. N. G. Mukerji, Sibpur—
Four packets of Sugar-cane seed.

Messrs. J. Carter & Co., London—
Forty-five packets of seeds.

Messrs. Haage & Schmidt, Erfurt, Germany—
Three packets of seeds.

Mrs. E. G. Hickie, Calcutta—
Nine books.

CONTRIBUTIONS.

The Chemist and Druggist, Vol. LIV. Nos. 1049 to 1056.

The Sugar Cane, Vol. II No. 15, and 16 for March and April 1900 from the Editor.

The American Florist, Vol. XV, Nos. 611 to 618.

The Canadian Horticulturist, for February and March 1900. From the Editor.

The Indian Sportsman, Vol. II, No. 14 to 21.

The Planter, Vol. VIII, Nos. 11 to 17.

Indian Gardening, Vol. VI, Nos. 11 to 18.

The Perak Govt. Gazette Vol XIII, Nos. 7 and 8.

Journal of the Asiatic Society of Bengal, Vol. LXVIII, part II, No. 4, 1899. From the Society.

Proceedings of the Asiatic Society of Bengal No. 11 for February 1900. From the Society.

May Flower, for March and April 1900. From the Editor.

Bulletin, No. 22, New Series, U. S. Department of Agriculture, Washington. From the Director.

The Indian Forester, Vol. XXVI. No. 3 for March, and No. 4 for April 1900. From the Editor.

West Indian Bulletin, The Journal of the Imperial Agricultural Department for the West Indies, Vol. I, No. 2. From the Director.

Bulletin of the Botanical Department, Jamaica, New Series, Vol. VI. From the Director.

The Gardening Circular, Vol. I, No. 9 10.

Agricultural Department, Assam Bulletin, No. 6, Industrial Series, No. 1 note on the Lac Industry of Assam. From B. C. Basu, Esq.

The Journal of the Royal Agricultural Society of England, III Series, Vol. II, part 1, Nos. 41 for March 1900. The Society.

Proceedings of the Boston Society of Natural History, Vol. 29, Nos. 1 to 8. From the Society.

Report on the River-borne Traffic of the Lower Provinces of Bengal and on the Inland trade of Calcutta, and the trade of the Chittagong Port of the year 1898-99. From Government of Bengal.

The Agricultural Ledger, No. 12 of 1899, 2 Copies From Government of Bengal.

Annual Report on Government Gardens and Parks, Mysore for the year 1899-99. From Government of Mysore.

Report on the Adminstration of Bengal during 1898-99. From Government of Bengal.

Memorandum on the prospects of the Rice, Indigo, Cotton, Sugarcane, Wheat and Oil Seed Crop of the Season 1899-1900.

From Government of India Revenue and Agricultural Department :

Memorandum on the prospects of the Sugarcane, Wheat, and Rapeseed Crop of the Panjab for 1899. From Director, Land Records and Agriculture, Punjab.

Memorandum on the prospects of the Linseed and Rapeseed Crops of 1899-1900. From Director, Land Records and Agriculture, North Western Provinces and Oudh.

Memorandum on the prospects of the Cotton and Gingelly, Crop of 1899-1900. From Director, Land Records and Agriculture, Madras.

Memorandum on the prospects of the Rice Crop of 1899-1900. From Director, Land Records and Agriculture Burma,

Memorandum of the prospects of the Linseed and Wheat Crop of the Central Provinces, Season 1900. From Director, Land Records and Agriculture, Central Provinces.

The Chemist and Druggist, Vol. LVI, Nos. 1057 to 1061. From the Editor.

The Canadian Horticulturist for April and May 1900. From the Editor.

The American Florist Vol. XV, Nos. 619 to 623. From the Editor.

The Indian Gardening, Vol. VI, Nos. 19 to 23, from May to 7th June 1900. From the Editor.

Bulletin of the Botanical Department, Jamaica. New Series Vol. VII, Part II, for February 1900. From the Editor.

Bulletin of Miscellaneous information and Appendix II, of 1900. From Royal Garden, Kew.

Proceedings of the Asiatic Society of Bengal, No. III, and IV, for March and April 1900. From the Society.

Annual Report of the Agri-Horticultural Society of Burma for the year 1899. From the Society.

Journal of the Asiatic Society of Bengal, Part II, Title page and Index for 1899. From the Society.

Indian Sportsman, Vol. II, Nos. 22 to 26. From the Proprietor.

The Planter, Vol. VIII, New Series, Nos. 18 to 23. From the Editor.

The Sugarcane, Vol. 2, No. 17, for May 1900. From the Editor.

The Gardening Circular, Vol. I, No. 2, for May 1900. From the Secretary.

The Perak Government Gazette, Vol. XIII, No. 12. From Government of Perak.

The May Flower, for May 1900. From the Editor.

Returns of the Rail and River-borne Trade of Bengal during the quarter ending the 31st December 1899. From Government of Bengal.

Pamphlet on Lupins for Green Manuring. By J. Brutt Davy.

Annual Report on the Singapore, Botanical Gardens for the year 1899. From the Director.

Exchanges.—Since last meeting plants and seeds have been exchanged with various gardens in New South Wales, Victoria, Natal, Jamaica, Madagascar, Java, Rangoon, Port Blair, England, Germany, Barbados, The Gold Coast and others in this country.

References.—The number of references received by the Society and replied to since last Meeting stand as follows:—Agricultural 92. Horticultural 175, From various Government Offices 47. Eighty two botanical specimens were received for identification.

The following is a list of the chief references received:—Acacias, 5. Acme Weed-killer 8. Aconitum heterophyllum, 2. Aermotors 8. Agaves 11. Araucarias 4. Arrowroot 10. Bamboos 2. Bulbous plants 4. Bone-meal 6. Brinjal 2. Caladiums 8. Cannas 15. Casuarinas 6. Coffee 4. Creepers 4. Cotton 4. Ceara-rubber 5. Eugeneas 2. Fruit trees 27. Fodders 14. Fibres 11. Ficus elastica 6. Irish flax 2. Indian plants 4. Ilex paraguayensis 3. Ichthemic Guano 14. Iris root 1. Kola-nut 4. Lawn-mowers 1. Lawns 6. Lawn-grasses 2. Lucerne 2. Marmalade 2. Maize 5. Marsdenia tinctoria 2. Manures 2. Marram grass 1. Magnolias 1. Mustard 1. Orchids 6.

Ornamental plants 23. Oris-root 1. Palms 5. Ponicianas 1. Polygonum tinctorium 2. Paspalum dilatatum 5. Para-rubber 2. Parameria glandulifera 2. Quercus serrata (Cachar Oak) 1. Roses 4. Reana luxurians 3. Rice 2. Rubbers 2. Specifications of Inventions 6. Seeds 3. Sugar Canes 4. Sansevieria 6. Soils 1. Sorghum 2. Sabai grass 1. Saffron 1. Singhara 1. (Trapa bispinosa) 1. Shade trees 2. Timber trees 1. Victoria regia 1. Vanilla 3.

Presentation of Books.—Read letter from Mrs. E. G. Hickie presenting the following books to the Society :—

The New Botanic Garden, Illustrated (1812) Vols. Nos. I and II.

The Magazine of Botany and Gardening, three volumes 1833, 1834 and 1836.

Choice Stove and Greenhouse Flowering Plants, B. S. Williams, 1869.

Beeton's All about Gardening, 1871.

A Book about Roses, S. Reynolds Hole, Second Edition.

The English Flower Garden, W. Robinson, 1883.

Resolved that the hearty thanks of the Society be accorded to Mrs. Hickie for her valuable gift.

Sugar-Cane Seed.—Read letter from Mr. N. G. Mukerji, Sibpur, forwarding four packets containing the following varieties of sugar-cane seed. No. 1 *Kerah.* No. 2 *Gogak*, No. 3 *Bourbon*, No. 4 *Red Mappoe.* Mr. Mukerji also sent the following instructions received from Mr. E. R. Osgood of the Cossipur Sugar Works "Plant the seed at once, lay them on the earth, don't cover the seeds with earth. Plant them in boxes in a mixture of good loam and a little sand and well rotted manure. Put the boxes in the sun, and water the seed with a fine rose watering

can. They want moisture and sun. Pick out into pots when 4″ or 5″ high and later on transfer from pots to fields."

The seeds were sown on date of receipt, 28th May, but it is yet too early to pass an opinion on the growth in the boxes, which are now covered with glass frames owing to the prevalent showers.

Paspalum dilatatum.—Read letter from the Government Botanist, Melbourne forwarding seeds of the above fodder grass. "I am pleased to be able to inform you that I have now procured seeds of *Paspalum dilatatum*, and beg to forward herewith three packets of ½lb each by post. Should you require more I will send them, but I think this will be sufficient to experiment with. I have not sent roots in a Wardian case, now that seeds are available. Here it is sown most advantageously in spring, when we have sufficient moisture and the sun gets warm; in dry weather the seed will sometimes be dormant for a considerable time. It is to be hoped that the grass will turn out a success with you; so many things have however, been ushered in with a flourish of trumpets and afterwards have not come up to the expectation, that it is well not to be over-sanguine."

Packets of this seed have been distributed to the following for experiment:—The Directors, Department of Land Records and Agriculture Assam, Bengal, Bombay, Burmah Madras, North-West Provinces and Oudh, and Punjab. The Commissioner of Settlements and Agriculture, Central Provinces. The Superintending Engineer, Jaipur. The Superintendents, Government Horticultural Garden Lucknow, Government Botanic Garden, Saharanpur, Government Horticultural Garden, Nagpur. The Manager, Bettiah Wards' Estate. The Manager, Tikari Wards' Estate.

Mr. O. V. Bosanquet, I.C.S. Political Agent, Bhopawar. Messrs. V. A. Mackinnon, W. S. Bremner, G. Meares. H. E. Crowdy and A. Cooke.

The Cannon-ball Tree.—Read a note regarding Couroupita guianensis.—This remarkable tree has now been in continuous flower for over two months, the flowers are produced in clusters on stems that shoot out from the tree, the flowers are large about 4 inches across, white, tinged with purple and somewhat sweet-scented. The general aspect of the flower is most difficult to describe, but it might he said to be saucer-shaped with a lip that folds on to it, the inner portions being covered with innumerable short, soft spines, white, tipped with purple. So far this tree does not appear to have fruited in India, though in Ceylon it has said to have produced fruit in shape resembling a cannon-ball from 6 to 8 inches in diameter.

Fagræa zeylanica.—This interesting shrub is now in full flower, the plant is very tropical in appearance, but requires to be grown in a moist, shady position, otherwise the leaves soon suffer through withering and unless plentifully supplied with water the plant remains dwarf. The shrub is well clothed with large, fleshy leaves from top to base, very little if anything of the stems being visible. The long cream-coloured flowers are produced at the ends of the stems in clusters of 8 to a dozen and open one after the other reminding one of Datura-flowers ; at times there is a slight scent given off.

Fern-root juice as a remedy for Snake-bite.—An enquiry has been received on this point, but no authenticated reports are available. Dr. Watt in the Dictionary of the Economic Products of India states, "*Asplenium fimbriatum* is said to be given by the natives of British Garwhal as a remedy for snake-bite." J. Smith in his Dictionary of Popular Names

of Economic Plants (1882), mentions a curious notion prevalent in England in olden days, of the supposed power of ferns when burnt in causing rain to fall, and in illustration of the fact quotes a letter written by Philip Herbert, third Earl of Pembroke, Lord Chamberlain, to the Sheriff of Staffordshire. It is as follows:—"Sir,—His Majesty, taking notice that the burning of Ferne doth draw down rain, and being desirous that the country and himself may enjoy fair weather as long as he remains in these parts, His Majesty has commanded me to write to you to cause all burning of Ferne to be forborne until His Majesty be past the country. Wherein, not doubting but the consideration of their own interest, as well as of His Majesty's will invite the country to a ready observance of this His Majesty's commands, I rest, your very loving friend, Pembroke and Montgomery."

Paraguay Tea.—A couple of references have been received regarding *Ilex paraguayensis. Yerba-maté, or Jesuists' Tea* as it is often called. This is a small evergreen tree of the Holly family, with plain or toothed leaves, a native of South America in the country about the Parana and Paraguay rivers. It is said that from time immemorial a beverage has been prepared from the leaves of this Holly in Brazil and Paraguay. According to John Smith "the leaves are either dried" "or scorched, and pounded, and become tea, which forms" "an important article of trade in South America, taking the" "place of Chinese tea as used in other countries. It is in-" "fused in the same manner, but is drunk in a different way" "being sucked through a tube called a *bombilla*; it is very" "refreshing after fatigue. *Maté* is the name of the small" gourd, which forms the drinking cup." Prior to 1882 it was calculated that at least 8,000,000 lbs. per annum of this tea was consumed in South America. Dr. Watt tells us that the leaves have a pleasant aroma and a principle analagous to that

in tea and coffee. It has the advantage of cheap and easy preparation, since it has been found unnecessary to cure or roll them by so expensive machinery as in the case of tea. The leaves are scorched or dried while still attached to the branches ; then removed by being threshed, ground to a powder and packed in skins or leathern bags. Dr. Watt states that in the Agentine Republic the consumption amounts to 27,000,000 lbs. per annum, or about 13 lbs. a head.

Ilex paraguayensis has been grown for about 4 years in the Society's gardens and is now about 12 feet high, it appears to flourish in the climate of Lower Bengal and forms a good specimen plant for a lawn.

The May Meeting.—Owing to an insufficient number of members being present, the meeting could not under the rules be held on the second Wednesday in May.

The New Price Lists.—Revised Price Lists of Ornamental Plants, Palms, Ferns, Roses, Cannas and Fruit-trees are now in the press and are expected to be ready for issue early in July, when copies will be posted to each paying member. It is proposed to give a short article in future issues of Journal and Proceedings, regarding each plant mentioned in the price lists, under the head of " Garden Notes," which will include description and method of propagation, &c.

REPORT ON VANILLA EXPERIMENT.

By A. J. B. Gisseleire,
Agri-Horticultural Society's Gardens, Calcutta.

During these last few years attention has been greatly drawn to products which were likely to succeed in India and give satisfactory results. The cultivation of Vanilla has been taken in hand more than once, but somehow it has never had, really speaking, a thorough trial; the trial was not carried on long enough, although it has shown that this plant grows and fruits in Lower Bengal without any difficulty. The experiments in Alipur Gardens have not been carried out on such an elaborate scale as were attempted in several places in Bengal some years ago; in fact the plants were here growing almost in a wild state in a mango grove, and such as they were, they served all the more to show what little trouble there is attached to their cultivation. This experiment has been conducted under the above-mentioned conditions just to show that anybody in Lower Bengal possessing a grove of mango trees can raise a crop of Vanilla without any further expense than the purchase of the plants to form a stock. In the gardens the Vanilla was planted at the base of the trees in good leaf mould, mixed with plenty of brick refuse, as drainage for the young plants; once put down they practically grew at their own sweet will, and soon attained fine vigorous growth. If this was done with a view of continuous production, the plants should not be allowed to grow over a height, say fifteen feet, as a maximum; if allowed to climb higher up, the work of fertilizing the flowers would become almost impossible. Last year, in the beginning of March, the plants showed their flower buds, the plants then were occasionally syringed, and by the 10th April the flowers were fertilized. At the end of that month the flowers, which had set, looked dried up, but still stuck to the pods, which were then beginning to lengthen out.

The main thing in growing Vanilla is of course the time when the flowers must be fertilized. This has to be done artificially. If left to themselves, perhaps not one in a thousand would give a pod. This operation is thus of the greatest importance, and should be done very carefully; on it depends the whole result of one year's trouble. The *modus operandi* can, of course, better be shown than described, and it requires a little practise and a steady hand before one can do it quickly, without spoiling the flowers or losing the pollen, etc. One must first of all prepare a little piece of bamboo cut into the shape of a toothpick : in fact, I have done the fertilization with this last named article and it answered admirably.

The anatomy of the Vanilla flower is somewhat different from the general run of other Orchid flowers. At the extremity of the gynostemium there is a little cap covering the pollen ; the first operation is thus to lift this cap and carefully take the pollen masses out on the end of the toothpick. Beneath this first receptacle is another little lip covering the stigma; under this lip will be found the stigma covered with a sticky liquid. The second operation consists in lifting this lip with the very point of the toothpick, holding already the pollen ; then, when the stigma is fully exposed, by a gentle twist apply the pollen on to it. When one has repeated this operation systematically a few times, it is really wonderful how quickly one can perform it. The segments of the flower should be drawn well back so as to facilitate the operation, and held with the left hand together with the ovary ; the operation of applying the pollen should be performed with the right, at the same time join the tips of the little fingers to steady both hands.

The pollen adheres very firmly to the stigma, and when once properly applied, there is little chance of its falling off. After the operation of fertilizing has been attended to very

little remains to be done. Nature then takes the matter in hand, and one has but patiently to wait the further development. The first sign by which one can detect whether the flower has set to fruit, is the way in which the segments stick to the top of the ovary. If not successful after a day, perhaps a couple of days, these segments drop, leaving only the ovary, which soon drops in its turn. The pods after the first two or three weeks grow very steadily and attain their full size about the beginning of November. Then they gradually begin to lose the bright green colour, and by December the nose of the pod turns yellow first, then slightly brown ; this is the time to gather the pods. The plucking of course must be done every day, for all pods do not ripen at the same time, and only those that part easily from the flower stem should be taken down.

After the gathering comes the curing. Having only a limited number of pods, they were sundried, wrapped up in woollen cloth, which I found answered very well. The pods developed a fine aroma and soon assumed that dark chocolate tint which, I believe, is recognised as very good.

LUPINS FOR GREEN-MANURING.

INTRODUCTION.

Green-Manure Crops.

The Need for Green-Manure Plants.—The importance of returning to the soil of orchards and vineyards an amount of nitrogen at least equivalent to that removed by the fruit crop, and also the humus gradually burnt out during the dry season, in order to maintain fertility, has caused the Experiment Station at Berkeley to devote much attention to the testing of various leguminous plants—plants of the pea and clover family—recommended for

this purpose in other parts of the world. While it is comparatively easy to find plants that will answer this purpose when or where summer growth can be allowed, as in the case of field crops, the selection of plants that will grow in winter so as to permit of being turned under before the summer's drought renders such growth too wasteful of moisture, is a matter of no little difficulty. The present bulletin is designed to give the most promising results thus far obtained, in order to promote large-scale experiments by farmers during the present and coming seasons.

Plants other than those of the leguminous order (clovers, peas, beans, lupins, etc.) are not recommended for green-manuring, for the reason that they supply to the soil only the humus, besides what substances they have taken from it during their growth ; while yet, a leguminous crop costs no more than any other. It is true that in the case of all tap-rooted plants the surface soil is enriched by what was taken from the subsoil. But as in the arid region the surface soil is largely of less importance than the subsoil, on account of the deep rooting and feeding characteristic of plants in arid climates, the advantage thus secured is greatly reduced ; as is also that of the crop roots being afforded an opportunity of deep-rooting by following the course of the tap-roots of the preceding crops. Moreover, nitrogen being the most expensive of elements supplied in manures, the advantage of securing it from the atmosphere without additional cost is obvious.

The legumes combine all the points required of a green-manure plant—nitrogen-absorption from the air, deep-rooting, and, at the proper stage of growth, that succulence which is conducive to quick decay, thus rendering the crop-ingredients available at the earliest moment. Nevertheless,

the plowing-in of other green crops or weeds, when convenient, should not be neglected.

It should be stated that the absorption of nitrogen from the air is conditioned upon the formation of excrescences or tubercles upon the roots; these being formed by the bacilli possessing that valuable faculty. When the soil is abundantly supplied with available nitrogen-compounds, tubercles may fail to form; and such failure may also result from the absence of the proper bacilli, rendering necessary the "inoculation of the land."

Peculiar Conditions require Peculiar Plants.—The peculiarities of the climatic and agronomic conditions of arid regions make it largely impracticable to utilize the crops employed in humid regions. Our choice is ordinarily restricted to annual plants, which make a good winter growth and can be plowed under in spring (usually in March,) so as to avoid the waste of moisture from summer growth; they must be adapted to calcareous soils; and must have stems not so woody as to resist fairly rapid decomposition.

It has been suggested that many of our native California species would prove better adapted to these conditions than introduced plants; but none of the numerous species so far tested for this purpose, have given entirely satisfactory results; they develop too late in the season; and are not always hardy against frosts.

Among the various leguminous crops so far experimented with at Berkeley, Bur Clover (*Medicago denticulata,*) Square-pod Pea (*Lotus tetragonolobus,*) and Snail Clover (*Medicago turbinata,*) have given the most promising results; but none of them yield as heavy a crop as could be desired, and the two latter have not been found suited to all our climatic conditions.

The Station has sent for a sufficient supply of seeds of the several kinds of lupins herein mentioned, for the distribution of small trial packets early in autumn. But as the success of some of the varieties mentioned for green-manure purposes is already definitely ascertained, it is hoped that the facts here given may induce some enterprising seedsmen, or private parties, to make larger importations from France and Germany for large-scale trials, which cannot fail at least to pay expenses, if they do not prove highly remunerative.

By J. Burtt Davy.

Report on Experiments conducted at the Agricultural Experiment Station, Berkeley, California.

Discovery of the Adaptability of Certain Lupins.—In cultivating in the Botanic Garden a Collection of Mediterranean-region lupins for comparative botanical study, it was found that the spring-sown plants did not have time to reach maturity before the hot, rainless season dried them up. It was therefore determined to try fall-sowing, with a view to catching all the moisture available, thus inducing winter growth and deep-rooting. As a result of this experiment it was found that whereas the spring-sown plots were a complete failure, the fall-sown, in accordance with Italian experience dating back to the Romans, produced heavy crops and were so promising that it was determind to test the species on a more extensive scale, with a view to the adoption of the best of them for green-manure crops. The results of these tests are outlined in the following pages.

Though the most important use of lupins lies in their adaptability for green-manuring, they are also grown extensively in Europe for cattle-forage and human food, and as ornamental plants.

DETAILS REGARDING THE SEVERAL SPECIES OF LUPINS.

1. LUPINUS PILOSUS, Linn.—This species is an annual and a native of the eastern Mediterranean region (Grecian Archipelago, Syria, Palestine, etc.) It is readily distinguished from all other species known to us by its large, flattened, brown, bean-like seeds, nearly half an inch broad, of which the outer seed-coat is roughened with minute projections; the leaves are large and velvety, with broad leaflets; the flower bracted.

The typical wild form does not appear to be in cultivation, but it has given rise to two cultural varieties, *L. pilosus cæruleus*, Hort. and *L. pilosus roseus*, Hort, both of which seem, from all available information, to be in cultivation in Italy and France, but probably only to a limited extent, as we find no mention of them in agricultural literature.

2. LARGE BLUE LUPIN (*Lupinus pilosus cæruleus*, Hort). Annual flowers large, dark blue, with a white line down the center of the standard, which in age changes to dark purple. The seeds are heavy, there being only 660 to a pound of Berkeley-grown seed.

Experiments at Berkeley.—For heavy, calcareous soils, this is undoubtedly the best of the species tested; it has shown no sign of root-rot, although species adjacent on all sides were affected; it is not injured by frosts at Berkeley, is more succulent than the varieties of *L. angustifolius*, produces more and larger foliage, and covers the ground better, branching more freely from the base. The size and heaviness of the seed would seem to be a disadvantage, but this is outweighed by the fact that owing to its branching habit, it requires more room in the rows, and the same weight of seed per acre will produce one-third more manure than in the case of the Small White Lupin; so that the former species

is in the end the cheaper of the two. It produces a larger number of well-developed root-tubercles even under the very adverse conditions which caused an absence of tubercles in all other species except No. 3 (the Pink Lupin).

Before branching it produces, very early in the season, a terminal flower-spike, and in this state is quite succulent. When the first pods form, the whole plant branches freely and becomes somewhat woody; these branches flower much later than the main stem. Owing to this peculiarity it may be advisable to plow in the green-manure at the beginning of February, or, if conditions of soil and climate make this impracticable, then to sow from two to four weeks later in order to bring the period of first flowering nearer to plowing time, the plants being in the best condition for quick decay when the first flowers appear.

Experiments at Pomona.—Mr. Mills, foreman of the Southern California Sub-Station near Pomona, reports that at first this promised to be the best species under observation, but that the larvæ of some insect attacked and destroyed a large number of plants and nearly killed the rest. The latter finally sent out branches which came into bloom when the plants were about eighteen inches high ; they were again attacked by the same insect, which destroyed nearly all the flower-heads; the weight of seed finally produced was little more than the amount originally sown. This species was also damaged by the frost of March 23rd, 1898, at 7 a. m., when for half an hour the mercury stood at 27° F. At Berkeley it was not affected by the frost of Feb, 4, 1899, when the thermometer registered 29-9° F., and when several other plants, including the native *Lupinus affinis*, were injured.

3. Pink Lupin (*Lupinus pilosus roseus*, Hort.) An annual, closely resembling the preceding variety in general habit,

size, pubescence, etc.; but the color of the flowers is pale pink, with a white line down the center which in age changes to magenta. The seeds are almost as heavy, there being 864 to a pound of Berkeley-grown seed.

Experiments at Berkeley.—This variety has the same habit of growth as the preceding and like it, is not affected by frost or root-rot; but the tests this year indicate that in new soil, not inoculated with the lupin bacteria, it will not always produce turbercles as readily as the Large Blue Lupin.

4. YELLOW LUPIN, (*Lupinus luteus sativus*, Hort.) *Lupinus luteus* of various authors ; *L. odoratus,* Hort., Fragrant or Scented Lupin.

FRENCH: Lupin jaune, lupin odorant. GERMAN: Gelbe Lupine.

Annual, low-growing and much branched from the base; stem succulent; flowers rich yellow, very fragrant.

The wild plant of which this is a cultivated variety is a native of the Mediterranean region.

Uses.—The Yellow Lupin has been grown since 1840 as a forage plant in parts of Germany (Saxony, Silesia, Pomerania, Bohemia, Moravia and Brandenburg) and of France (Boulogne, Manche and Bourbonnais.) It is also said to be grown in some parts of England, and in Norway as far north as 70° latitude.

It is the least bitter of the cultivated lupins, but animals are said not to care for it in a green state, and it is usually made into hay. At present, however, it is extensively cultivated as a green-manure, to improve the the poor sandy soils found in parts of Prussia and of France; for this purpose it is considered the

best of all the species tried there, and will thrive even on drift-sands of the sea coast. Langethel observes that what the Sainfoin is for the poorest limestone or marly soil, the Yellow Lupin is for sandy land. As a green-manure it is considered superior to the Small Blue Lupin, because the roots penetrate the soil to a much greater depth, and because rye is found to succeed much better after the Yellow than after Small Blue Lupin; wherever possible, therefore, the former is grown in preference to the latter, as far as Europe is concerned it is more extensively grown than any other species. Kettle observes that this species shows an advantage over the others in never being choked by weeds if the soil is at all suitable.

Soil.—Heuzé states that it will not succeed in impermeable or calcareous soil, but that it grows well in deep sandy, and light and ferruginous soils, and forest lands which have lost their acid character; it is not grown on clay soils. Werner notes that it does not do as well as the Small Blue Lupin on gravelly or marly soils. Our own observations show that of all the species tried at Berkeley, this is the most difficult to grow in heavy, strongly calcareous adobe soils, partly owing, doubtless, to their impervious character; for the seeds germinate readily and the plant makes a good stand when the soil has been dressed with stable manure.

Cultivation.—In France it is customary to sow from 70 to 110 lbs. of lupin seed to the acre. In Hanover the following rotation is often practiced. With the last hoeing of the potato crop, from the end of April to the middle of May, lupin seeds are dropped between the rows of potatoes. In the fall the potatoes are harvested and the lupins plowed under. Rye or winter wheat is then sown, sometimes immediately after plowing, without any bad results (Kettle);

through oftener fourteen days are allowed to intervene. After the grain harvest, in the following August, the land is again plowed and lupins are sown for a winter crop, which is plowed under in the spring and is followed by a crop of oats. When grown for seed the Yellow Lupin is harvested at the end of August.

Experiments at Berkeley.—For three successive seasons this species has proved a failure in the strongly calcareous adobe soil at Berkeley, except when treated with stable manure; in which case, however, though it made a fine growth of succulent matter, scarcely any tubercles were produced showing that the nitrogen was derived from the soil. There is little doubt that if sown early enough this species would prove very beneficial on our light, non-calcareous soil, and it should be tried in the granitic and red soils of the Sierra Nevada foothills, and the sandy soils on the plains at the foot of the Tehachapi and the Sierra Madre ranges. It has not been affected by frost or root-rot. It is much later in time of flowering then either of the varieties of *L. pilosus* or of *L. angustifolius*, not coming into bloom till the second week of March. The table on p. 1190 shows the yield of green material to be very poor; but this is due to the fact that in this instance few seeds germinated and but very few plants came to maturity, doubtless owing to the soil conditions. In manured soil, where all the seeds germinated and the plants attained good height, the weight of green material was much greater.

5. Succulent Lupin (*Lupinus affinis*, Agardh).—A rather low (2 to 2½ feet high), much branched, succulent annual; flowers purplish, seeds medium-size. Indigenous to California, growing luxuriantly on sloping adobe or clay banks, from Marin County southward to San Diego.

Experiments at Berkeley.—We are not aware that this species has been tried, either for forage or for green-manure, except in California, and with us it has proved unreliable in germination, slow in coming to maturity, and less resistant to frost than the foreign species. Several plants were cut to the ground in the cold snap of February 4, 1899 (20.9° Fahr. at the University observatory, and probably still lower on the low ground), when the European species were not affected.

Lupinus affinis ranks next to *L. luteus* in succulence, but does not decompose as throughly nor as rapidly. Although its germination is unreliable, yet under cultivation it shows a tendency to improve in this respect. It produces a heavy crop of seeds. Under steady cultivation this species is likely to prove a valuable plant for green-manure in *frostless* regions; it produces an abundance of tubercles both in new soil and in soil which has been manured. On this account, and because of its heavy yield per acre and great succulence, it is worthy of more attention.

6. Narrow-leaved Lupin (*Lupinus angustifolius*, Linn.)—In modern Greece called "agri lupouni," and in Egypt "termis el Sjaeitan" (Satan's Lupin), possibly on account of its habit of springing up as a weed among crops of cultivated lupin, like the tares of the Scripture parable.

Annual, branching from the base, about $1\frac{1}{2}$ feet high; leaflets narrow; flowers small, pale blue; seeds ovoid. smooth, mottled with gray and white. Not in full flower till the middle of April.

This is the typical wild form, a native of the Mediterranean region of south Europe and north Africa, where it occurs as a weed in grainfields. We first find mention of it about 306 B.C. It is supposed to be the plant spoken of by Dioscorides as "thermos agrios," and the "lupinoum

agrestum" of the Romans. It does not appear to be now cultivated for agricultural purposes, but from it have been obtained the valuable varieties called respectively *cæruleus* and *diploleuca*, the Small Blue and the Small White Lupin.

Naudin says that sheep are pastured on it in places where it grows wild, It is said to prefer sandy, poor soils, and appears to dislike excess of lime.

Experiments at Berkeley.—During three successive seasons we have found *Lupinus angustifolius* much less reliable than the two succeeding varieties; it does not germinate well in our calcareous soil, makes an unequal stand, and is shorter and slower of growth. It branches much more freely from the base than its varieties, but like them it lacks the succulence of some other species. It is liable to infection with root-rot. The stems do not decompose readily: after being plowed under and remaining a month (from March 18 to April 22, 1899,) they were still long and fibrous. The species produces but few tubercles, and is late in flowering.

7. Small Blue Lupin (*Lupinus angustifolius cæruleus*, Körn. —German: Blaue Lupine; French: Lupin bleu, lupin à fleurs bleus, petit lupin bleu.

Closely resembling *L. angustifolius*, of which it is only a cultural variety, but taller (3 feet), not branched from the base, and with flowers of a brighter blue. It is in full flower early in March. A somewhat woody-stemmed variety. As to when and where it originated we appear to have no record; it is probably the plant referred to by Tournefort, in 1709, as "*L. angustifolius cæruleus elatior.*" It was first cultivated in Germany for green-manure in 1830.

Uses.—It is now grown extensively for green-manure, both in Germany and France, especially about Bordeaux (Kette). According to Cornevin it was more largely grown in France in former times than at present, being used for feeding sheep; it has been neglected for this purpose of late years, on account of its poisonous qualities. Langethal considers that it is of small value as green forage, on account of the hardness of its stems, but that the large amount of seeds produced, which are also fed to stock, renders it a valuable crop.

Soils.—Werner states that on gravelly and marly soil the Small Blue Lupin gives better results than the Yellow Lupin. It is fairly tolerant of limy soils in California, but less so than the varieties of *L. pilosus*. Langethal notes that it grows very well on a stiff and even a clayey soil which is sufficiently broken up by repeated plowing; in this respect it is superior to the Yellow Lupin. Werner states that the seeds of this species lose the power of germination more rapidly than those of *L. luteus*, but they are easier to collect, not falling out of the pods as readily as they do in that species.

Experiments at Berkeley.—At first this gave promise of being the species best adapted for green-manuring in middle California; it germinates readily, and makes an excellent stand in our calcareous, blackish adobe soil, is not affected by frost and is a rapid and robust grower. It does not, however, branch well from the base, and fails to rot quickly and thoroughly after ploughing under. During the present season it has been badly affected by a root-rot, which has in some rows destroyed from 50 to 75 °/₀ of the plants, especially in the late-sown plots.

Chino Valley—Mr. Mills reports for 1897-98 that at the Southern California Station it came up in good season after

planting, and promised to make a good growth; it was badly damaged, however, first by hares, then by the heavy frosts of March 23rd, finally by root-rot. This species early produces a very long tap-root in the Pomona soil. For the season of 1898-99 Mr. Mills reports that although the plants were frozen stiff clear to the ground, by the heavy frost of February 6th they showed no bad effects after thawing out. He considers that if the ravages of root-rot can be successfully combated, by treating the seed or by any other means, this species will be pre-eminently the best for the uncertain seasons of southern California.

Sierra Foothills.—The Small Blue Lupin appears to be absolutely worthless on the granitic and red soils of the Sierra foothills at Jackson, Amador Co. With a rainfall of twenty-six inches, plants raised from seed sown October 24th and 25th, 1898, had only attained a maximum height of eight inches by April 20th, 1899, at which time they were setting seed. Much the same result is reported from Anaheim, Orange Co.; but in both cases it may have resulted from the late sowing.

8. Small White Lupin (*Lupinus angustifolius diplo-leuca*, Körn.) German: Ostpreussische weisse Lupine. Scarcely differs from the var. *cæruleus*, except in having white flowers and white seeds.

Kette states that since 1881 this plant has been increasingly grown in Germany for forage, as a substitute for the Small Blue Lupin, because the seed is less injurious to cattle than that of the latter variety.

In California there is no difference noticeable as to the growth of the plant; it appears to be equally susceptible to root-rot.

Southern California.—Mr. Mills reports as follows for 1897-98 : "Sown October 19th sprouted November 1st, it came up in good season after planting, and promised to make a growth that surpassed that of any other variety; but the hares made a dead set on it, and before we could get the batch of invaders killed off, they had cut off the central stem of all the plants, and they lost considerable valuable time. They then sent out lateral shoots, but again lost considerable time when they would otherwise have made their best growth, for the heavy frost on March 23rd killed the greater part of the flower-spikes. It finally matured seed when about two feet high. It would undoubtedly be the best of the species tested, if given a fair start, and with normal conditions of weather."

9. Large White Lupin (*Lupinus albus*, Linn.)—*Lupinus albus vulgaris*, Alefeld. German, Weisse, Dünglupine, Gewohnliche weisse Lupine. French, Lupin blanc, pois lupin, pois de loup, or fève de Loup. Italian, Lupino, and Portuguese, Tramoso, Hindustani, Turmas, Turmuz, Bengali.

Not unlike *Lupinus pilosus* in habit, but the flowers are white, without bracts; upper lip of calyx entire; seeds smooth, white.

The Large White Lupin is apparently a native of Italy and Sicily; it also occurs in a wild state, but perhaps naturalized, along the eastern coast of the Mediterranean and as far as the east as the Caucasus.

History.—It appears to have been grown in Egypt at a very remote period of antiquity. It is considered to be identical with the "lupinus" of Cato, Varro, Virgil, Columella, Pliny and Palladius, and the "loupinoum" of Dioscorides. The Greeks and Romans cultivated it as early as 396 B.C. for green-manure, as well as for the seeds. The

occurrence in Spain of four common names for this plant, differing according to the province, indicates, according to De Candolle, its very early cultivation in that country. In Germany it was first cultivated in the Rhine provinces, in the 16th century, for green-manure only; in Austria in the 17th century, and in Saxony in the 18th century. In Italy it was being very largely grown in the 18th century.

In recent times the Large White Lupin has been cultivated in Egypt, Greece, Italy, Spain Portugal, southern France and Germany. It is not much grown in northern France, being subject to injury from frost. In southern France it can endure a temperature as low as 10° C., (14° F.) if sown sufficiently early in the fall; in the north of Europe, on account of frost, it is not sown before the middle of April, does not flower before the end of August, and fails to rippen seed (Kette).

Uses.—In some parts of Italy it is used as a mulch around the olive trees. The French grow it to improve the quality of their poorest lands. In Germany it has been considered a good green-manure, as it yields a large quantity of foliage; but latterly it appears to have fallen into disuse, and to have been superseded by the Small White Lupin.

Naudin states that in Spain and Portugal the Large White Lupin is considered a good and nourishing forage plant; Vesque considers, however, that its foliage is too bitter to serve for this purpose. De Candolle states that the seed is good fodder for cattle, but in Germany it has been found that cattle dislike both leaves and seeds. In Portugal, according to von Mueller, it is highly esteemed, under the name of Tramoso, as a remedy against pernicious and obstinate weeds, especially Sorrel (*Rumex acetosella*, Linn.) on account of its close and early growth.

The seeds, boiled to deprive them of their poisonous properties, were sold for human food in the streets of ancient Rome, and were also used for food by the ancient Egyptians and Greeks. They are still so used by the inhabitants of Andalusia, Corsica, Piedmont, Spain, and Portugal, according to Cornevin.

Soils.—In southern Europe the Large White Lupin is grown almost exclusively on sandy and siliceous soils. In Germany, von Wulffen cultivated it only on a warm sandy soil, and found that marling did not perceptibly increase the yield. Dr. Pabst found that it would make a growth, though only small, on a loamy, sandy soil, which contained much lime and magnesia, and on which the Yellow and Small Blue Lupins always failed ; so that, though susceptible to calcic carbonate, it seems to be less so than those species (Werner.)

10.—Egyptian Lupin (*Lupinus Termis*, Forsk.)—*L. albus Termis* Alefeld ; *L. prolifer*, Desrouss: Sicilian, Roman or Neapolitan Lupin: German, Weisse Futter-Lupine, Aegyptische or Sicilianische Lupine, Römische Lupine, Sprossende Lupine : Egyptian, Tharmos : Arabic, Termis or Termus.

Described as very closely resembling *L. albus*, but taller and branching from the ground ; keel blue, darker at the tips ; seeds larger, only 305 to a pound of German-grown seed; flowers later. In Germany, it does not ripen seed till October.

It is found wild on some of the islands of the Mediterranean, was cultivated by the ancient Egyptians, and is still cultivated in Egypt, Greece (Boissier,) Crete (De Candolle), and Germany (Kette.)

Use.—In Germany it is said to yield a large amount of green forage, but the stem becomes woody towards autumn. In Egypt the seeds are eaten, after steeping to remove the bitterness, and they are even exported to India (though not cultivated there) and sold in the bazaars under the name of *tourmus* (Royle). We have no record of its having been used for green-manuring ; it may prove too woody for this purpose.

Soils.—Kette observes that the Egyptian Lupin is less susceptible to lime the than *L. luteus* ; he considers that the soil best adapted to it is a sandy loam, or a loamy sand ; a small quantity of lime carbonate in the soil seems to have a beneficial influence in shortening the period of growth.

He observes that in uncultivated, sandy soil, where the Yellow Lupin attained a height of 2 feet, the Egyptian Lupin was only 6 inches high ; while in cultivated soil it attained a height of 4 feet, and on manured loamy soil a height of 7 feet. Manure is said to cause a greater increase in yield in the case of the Egyptian Lupin than in the case of the small Blue or the Yellow Lupin.

11. Cruickshanks' Lupin (*Lupinus Cruickshanksii*, Hook).—*L. mutabilis* Lindley, not of Sweet.

A tall, woody annual, native of Chile and Peru, and long cultivated as an ornamental plant ; the flowers are very handsome, the standard being white, streaked with purple on the margins and with a yellow spot in the center ; in age the white standard changes to purple. In recent years it has been grown for forage in Germany, and it is said that cattle prefer it to the Yellow Lupin, especially if mixed with clover. German writers state that it needs a good soil if side shoots are to be formed, but that if the soil be too rich it will not make much seed.

At Berkeley all but two of the seeds germinated readily in the season of 1897-98, but were killed by a hot north-east wind just after the cotyledons appeared above ground. The two more tardy seedlings survived, however, and one produced seed from which the present crop has been raised. This year (1898-99) it has made a good growth ; but has not produced tubercles, as it was sown in manured soil. Doubtless it will produce tubercles in unmanured soil, but it does not appear promising for green-manure, as the stems are rather woody. Our plants made very few side-shoots below, though the soil was rich, but branched well from above. Another season's test is necessary before its value can be ascertained.

12. The Tricolored Lupin (*Lupinus tricolor*, Hort.), of south European gardens, has been tried at Berkeley, but without very satisfactory results so far. It is less tall and more branched below than the preceding species. The flowers are at first very light-colored, the standard being pale lavender and the wings pure white ; after a few days the color of the standard gradually deepens to rich purple, and that of the wings to a lighter tint of the same.

13. Perennial Lupin (*Lupinus perennis*, Linn.)—Perennial ; rootstocks creeping ; stem branching very freely, covering the ground ; flowers pale bluish-purple ; seeds very small. Flowering period, May and June.

Native of the eastern United States, from Canada to Florida. Cultivated in Germany as a forage plant, and found less objectionable to cattle than the Yellow Lupin. It requires a good soil, retentive of moisture and clayey, because the creeping rootstocks draw their moisture from the surface, not reaching down to the subsoil ; on this account Langethal considers that it may prove a valuable substitute

for other leguminous crops in places where the surface soil is good but the subsoil poor, as in some of the hilly parts of middle Germany. It begins to grow early in the spring, and according to Langethal "will be 4 inches high by the time the apples are in bloom." Several crops can be obtained in a season, the first, of which is ready early in June.

We do not find any record of its having been grown for green-manure; perhaps the creeping rootstocks make it unsuited for this purpose, as plants with this habit are usually plowed under with difficulty, and pieces of the root continue to grow long after the time when orchard or vineyard should be clear of weeds, to prevent undue loss of moisture by their transpiration.

14. Hairy Lupin (*Lupinus hirsutus*, Linn.) *L. digitatus* Forsk.—Annual; reddish-hairy; flowers blue; seeds somewhat flattened, grayish-brown, smooth.

Native of the northern shores of the Mediterranean, from Spain to Asia Minor. Cultivated extensively in Germany as an ornamental plant, it has also been tried as forage, and it is said that the cattle prefer both the green parts and the seeds to either the Small Blue or the Yellow Lupin. It has a disadvantage in that it does not flower till July (in Germany), and the seeds ripen late. The pods open too easily, making it difficult to collect the seed. It requires a good soil, and apparently will not thrive on the poor sandy soils on which the Yellow Lupin does so well.

Summary.

Thirteen species or varieties of lupin are more or less extensively cultivated as agricultural crops in various parts of Europe and north Africa: of these, eleven are natives of

Europe, one of Chileand Peru, and the other of North America. Seven of the most important species have been the subject of investigation at Berkeley in the last four years, but some of them only during the present season.

In addition, ten annual native Californian species have been under cultivation in the Botanic Garden at Berkeley for seven years ; only two of these, however, *Lupinus affinis* and *L. micranthus,* promise to be of any agricultural value.

Species Recommended for Green-Manuring in California.—For heavy, strongly calcareous soils in middle California, such as the adobe lands, the Pink Lupin (*L. pilosus roseus*) and the Large Blue Lupin (*L. pilosus cæruleus*) are much the best of the various species tried at Berkeley. Though the seeds of these two species are few to a pod, large and heavy, and are therefore more expensive than those of any of the other species tried, an equal weight of seed will produce a larger amount of green material than in the case of the others, (compare the *L. angustifolius diploleuca* and *L. pilosus cæruleus* where the weight of seed sown is the same, while the yield of the latter species is one-half as much again.) For the Chino Valley, Mr. Mills considers the Small Blue Lupin *(L. angustifolius cæruleus)* to be pre-eminently the best species, if the ravages of root-rot can be successfully checked.

For the light, non-calcareous soils, the Yellow Lupin (*L. luteus sativus*) would undoubtedly be the most satisfactory, as it is so much less woody than any of the other species, and rots so much more quickly and thoroughly.

Cultivation.—The success or failure of European Lupins depends almost entirely upon sowing sufficiently early to catch the first rains, and at a time when the soil is yet warm enough to stimulate germination and prevent the rot-

ting of the seed. If sown the last of September the Pink and Large Blue Lupins are ready to plough under by the first of February, and the Yellow by the middle of March.

In Germany, where a crop of rye usually succeeds lupin, it has been customary to allow about fourteen days to elapse between plowing in the lupin, and sowing the new crop, in order to allow the former to rot. Von Wulffen finds, however, that this is not necessary, and in France it is customary to sow immediately after plowing. Von Wulffen states that the green crop can be plowed under either just before, during, or after flowering.

Lupins as well as other leguminous plants do not, as a rule, make tubercles in soil freshly manured with stable manure; the manure is injurious to the tubercle-forming bacteria. This does not prevent the lupins from making a good growth, however; indeed they will often become very rank in manured soil, but the manure tends to check the formation of seed. We can readily see, therefore, that it is a needless expense to manure land for lupins, or to sow lupins on land already manured, as the presence of stable manure prevents the accomplishment of the chief end for which they are sown, viz: the collection of nitrogen from the air by means of the bacteria on the roots.

Soil-Inoculation.—Where lupins do not grow wild or have not previously been cultivated, it is sometimes necessary to inoculate the soil, in order to secure a satisfactory growth. By inoculation we mean in this case, the transfer of small quantities of soil in which lupins have been grown, to the plot in which it is wished to cultivate them. The necessity for this inoculation arises from the circumstance that the bacteria peculiar to lupins do not make tubercles on plants of any other leguminous genus,

and therefore are not found in soils in which lupins have not grown.

For successful inoculation, Professor Hilgard recommends the use of lupin soil taken from the first six inches, in the proportion of about a half ton to the acre. It should be spread lightly over the surface, immediately after receipt, and then be harrowed or cultivated in without delay, to prevent drying out, which would destroy the life of the bacteria.

Soils.—In a communication to the Landwirtschaftliche Presse of Berlin, written last summer, Professor Hilgard points out that where lupins will suffer from the presence of 0·46% of calcium carbonate in sandy soils, as shown by Heinrich, they will tolerate twice as much in heavy clay soils.

Rotting.—On March 18th, of this year a portion of the plots under observation at Berkeley was turned under to determine the relative rotting capacity of the different species. On April 22nd the rows were opened, with the following results, numbered according to degrees of decomposition:

1. Yellow Lupin, thoroughly rotted.
2. Succulent Lupin,
3. Small White Lupin,

A considerable amount of fibrous matter left, but less than any of the succeeding species.

4. Pink Lupin,
5. Large Blue Lupin,

Not so good as 2 and 3, but better than Nos. 6 and 7.

6. Small Blue Lupin,
7. Narrow-leaved Lupin,

Foliage well rotted, but stems still very fibrous.

Method of Sowing.—Mr. Mills reports from Pomona: "The drill system seems to be the only practical method of putting lupin seed in the ground where irrigation is contemplated. By using a beet drill the seed can be planted with little expense, fifteen or twenty acres being an average day's

work in an orchard. The cultivator used with a beet outfit can be used both for preparing the ground for irrigation, and for cultivation afterward. The regular duckfoot attachment that goes with the machine, if bent slightly backward, will make an excellent furrower. By mixing corn, cracked to prevent germination, with the lupin seed, the latter can be distributed along the rows at any distance desired. The lupin seed being much heavier than cracked corn, a mixture of half and half by weight, would require a comparatively small outlay for corn, to make the seed go over two or three times the area that it would if planted alone." Mr. Mills recommends light sowing, both for a green crop and for seed, as close planting encourages the spread of disease and prevents the "setting" of seed in all the pods, which is not counterbalanced by the increase in number of plants.

Use of Lupin Seeds for Human Food.—The seeds of many—perhaps all—species of lupin contain a bitter alkaloid known as *Lupinin*, which is very poisonous to human beings. This bitter principle can be removed, however, by boiling, or by maceration in salt water or soda solution; in this state the seeds were used for human food by the ancient Egyptians, Greeks and Romans, and they are still so used in India (imported from the Mediterranean) and in Corsica, Piedmont, Spain and Portugal.

Use for Forage.—Although the foliage and seeds of lupins are bitter, they are grown for forage purposes in several parts of Europe. The species which are least bitter are the Yellow and Cruickshanks' lupin; the former is the one most commonly grown for this purpose on poor sandy soil in southern Europe. On heavy soils, unsuited to the Yellow lupin, the Small Blue lupin formerly took its place; this species is more bitter than the Yellow lupin and was found to be injurious to cattle, it has therefore been abandoned in recent years and its place

supplied by the less noxious Small White lupin. The Large White and Egyptian lupins are said to be grown for forage to a small extent in southern Europe, but are generally considered too bitter for this purpose.

The foliage of the Yellow lupin is said to be not inferior to that of clover, and at the same time more bulky ; indeed one writer states that, "when cut just at the end of flowering it is the most highly nutritious of all coarse fodders"; the seeds, also, are very fattening when used as an addition to ordinary fodder, and are said to be quite equal to oilcake. In Germany the average yield of air-dry forage is from 3,640 to 4,550 lbs. per acre, but in deep, new, sandy soils it is said to yield 5,460, 7,880 and even 9,100 lbs.

Lupin fodder is said to be fed either green or in the form of hay, but more frequently in the latter condition owing to its bitterness when green.

It is found to be unsuitable for feeding alone, as it then produces the disease called *lupinose*. Cornevin states that *lupinose* is particularly severe when stock are fed almost exclusively on lupin chaff, only mild when hay, oilcake or mangel-wurzel form a certain proportion of the ration, and it is given at intervals. In Germany it has been found that sheep will be affected with *lupinose* if supplied daily, without interruption, with 500 grammes (17 ounces) of the plant including well-formed pods and seeds, or 300 grammes (10 ounces) of empty pods, or even with only 100 grammes ($3\frac{1}{3}$ ounces) of seeds. Drying does not affect the poisonousness of the plant, and the race, sex or age of the animal appears to make no difference as to its susceptibility. Sheep, cattle, horses, goats, dogs and tame rabbits are subject to the disease.

Lupinose appears in two forms, acute or chronic, and is accompanied by lack of appetite, difficult respiration, high fever, spasm and sometimes vertigo, resulting in death in the first case in four to six days, in the second in fifteen to twenty days. These symptoms, it will be noted, are quite similar to the "loco" of western pastures.

The Yellow lupin is considered much more poisonous than the Large White, and the Perennial lupin less so than any other species. In using *any* species for forage, great care must be taken not to use too much at a time, especially of the seeds, and not to use lupin ration without intermission. In the event of any cases of *lupinose* appearing, the use of lupin should be abandoned entirely. Lupin should never be used exclusively in a ration.

For forage purposes the lupins, therefore, do not appear to offer any advantages over other leguminous crops, except as winter growers, and they are certainly more or less dangerous and not to be recommended indiscriminately.

TABLE I.—Comparative table of cultures of various Lupins at Berkeley.

Seed sown in plot 8 x 5½ feet ($\frac{1}{990}$th part of an acre) September 28, 1898.

	LARGE BLUE.	PINK.	YELLOW.	SUCCULENT.	NARROW-LEAVED.	SMALL* BLUE.	SMALL WHITE.
Number of seeds to 1 lb.	760	864	.....	.....	.....	2,944	2,528
Amount sown per plot	1½ oz.	2½ oz.	½ oz.	½ oz.	½ oz.	1 lb, 1½ oz	1½ oz.
Equivalent of seed in lbs. per acre	lbs. oz. 92, 13	lbs. oz. 154, 11	lbs. oz. 30, 15	lbs. oz. 30, 15	lbs. oz 30, 15	lbs. oz. 119, 1½	lbs. oz. 92, 13
Date of sprouting	Oct. 10	Oct. 10	Oct. 10	Oct. 8	Oct. 10	Oct. 8	Oct. 8
Commenced flowering	Jan. 4	Jan. 25	Mch. 8	Feb. 8	Mch. 22	Feb. 22	Jan. 25
Full flower	.....	.....	.....	.....	Apl. 15	Mch. 7	.....
Height of plant, in inches, on March 15	26	26	13½	24	18	36	37
Yield of green stuff, in lbs., free from soil, on ½ plot (4x5½ ft., or $\frac{1}{1980}$th part of an acre; weighed March 18, 1899	19¼	17	8¾	14¾	4½	10¼	13¼
Equivalent in lbs. per acre	38,115	33,660	17,325	29,205	8, 910	20,295	26,235
Equivalent in tons per acre	19	17	8½	14½	4½	10	13
Equivalent on the basis of 100 lbs. of seed sown per acre: in lbs.	41,066	21,760	56,000	94,400	28,800	17,041	28,267
Equivalent on the basis of 100 lbs. of seed sown per acre: in tons	20½	10¾	28	47	14½	8½	14

* Plot 20 x 20 ft., $\frac{10}{1089}$ acre.

TABLE II.—Comparison of weekly growth at Berkeley.

	LARGE BLUE	PINK.	YELLOW.	SUCCULENT	NARROW-LEAVED.	SMALL BLUE.	SMALL WHITE
Height of plant, in inches, on—							
October 17	2	1½	1½	(15th) 1	(17th) 1½	(15th) 2	(15th) 2
October 24	4	3	2	(22d) 1	(24th) 2	(22d) 2	(22d) 3
October 31	4	4		(29th) 2	(31st) 3	(29th) 5½	(29th) 4
November 6	6	4	3	(4th) 2	(6th) 3	(4th) 7½	(4th) 6½
November 14	6	5	3	(12th) 2	(14th) 4	(12th) 8	(12th) 8
November 21	6	5	3	3	4½	9	8
November 28	6	5	4	4	5	9½	9
December 5	6	6	4	4	6	12	11
December 12	7	6	4	5	6	13	12
December 19	7	6	4	5	6	14	12
January 4	8	6	4	7	6	15	14
January 11	10	7	4	7½	7	16	15
January 18	12	9	4½	9	7½	18	17
January 25	13	12	5	11	9	21	21
February 1	17	15	6	14	9	24	24
February 8	18	16	6	14	9	25	25
February 15	20	18	7	18	10	26½	26½
February 22	24	18	9½	21	12	30	32
March 1	25	22	11	23	15	33	34
March 8	26	24	13	23	16	35	36
March 15	26	26	13½	24	18		37
							36

TABLE III.—Comparison of yield per acre of various lupins.

SPECIES.	POUNDS OF SEEDS SOWN PER ACRE.	YIELD OF GREEN-MANURE PER ACRE	TUBERCLES. MARCH, 1899. (In poor soil.)	AFFECTED BY DISEASE.	REMARKS
L. angustifolius....	30 lbs, 15 oz.	4½ tons (8,910 lbs.)	Few, often none.	Liable to infection.	Covers ground well, but unreliable in germination; woody.
L. angustifolius cæruleus.	119 lbs. 1¾ oz.	10 tons (20,295 lbs.)	Scarce, often none.	50-70 per cent.	Very reliable; makes good stand, but does not cover ground well; is too woody
L. angustifolius diploleuca.	92 lbs. 13 oz.	13 tons (26,235 lbs.)	Scarce, often none.	Many plants affected.	Same as L. pilosus cæruleus.
L. luteus sativus....	30 lbs. 15 oz.	8½ tons (17,325lbs.)	Few.	Not affected.	Covers ground well; and is very succulent, but unreliable in soils rich in lime. By far the best species for non-calcareous soils.
L. affinis.....	30 lbs. 15 oz.	14½tons (29,205 lbs.)	Many.	Not affected.	Covers ground well; the most succulent of all species tried, but somewhat unreliable and subject to frost.
L. pilosus roseus...	154 lbs. 11 oz.	17 tons (33,660 lbs.)	Few.	Not affected.	Covers ground well, but is more woody than some species, and in new soil does not always form good growth of tubercles.
L. pilosus cæruleus	29 lbs 13 oz. (Compare with a ngustifolius diploleuca)	19 tons (38,115 lbs .)	Very numerous.	Not affected.	The best species of any tried; being somewhat woody it may need plowing in earlier or sowing later, or it may be necessary to mow with a reaper before plowing; makes good tubercles even in new soils.

THE AGRICULTURAL AND HORTICULTURAL SOCIETY OF INDIA.

The Special General Meeting held at the Metcalfe Hall, at 4-30 p. m., on Friday the 27th April 1900.

Present:

MR. H. C. EGGAR, *President, in the Chair.*

MR. W. D. CRUICKSHANK.
BABU JOY GOBIND LAW, C.I.E.
RAJA PEARY MOHUN MUKERJEE, C.S.I.
RAI PROSONO COOMAR BANERJEE BAHADUR.
MR. G. FOSTER.
MR. N. S. WATKINS.
„ C. M. LANCASTER.
„ J. W. BAKER.
„ H. F. KING.
„ W. H. MILES.
„ E. J. KING.
„ H. ST. J. JACKSON.

MR. P. LANCASTER, *Secretary.*

THE Chairman explained the objects of the Meeting and the circumstances necessitating it.

The following were then read:—

(1.) The notices convening the Meeting published in the *Englishman*, *Indian Daily News* and *Statesman* of the 28th March 1900.

(2.) The minutes of the several Meetings held regarding the disposal of the Metcalfe Hall.

(3.) Various official and demi-official letters on the subject.

(4.) The letter dated 20th March 1900, addressed to Mofusil Members.

Mr. H. C. Eggar, proposed the resolution in his name. "That the conditional offer made by the President to," "and accepted by, the Government of Bengal for the" "transfer to the Government of India of the right, title," "and interest of this Society in the Metcalfe Hall property" "in consideration of a perpetual annuity of Rs. 6,000," "unfettered by any conditions affecting its enjoyment," "and a sum of Rs. 25,000 in cash be, and is hereby" "adopted and confirmed, and that the President be, and" "he is hereby authorized to carry such transfer into" "effect."

Seconded by Mr. W. D. Cruickshank.

A poll was then taken with the following results:—

Mofusil votes for	186	Against	3
Town „ „	14	„	0
Total for	200	Total against	3

The Chairman declared the resolution was carried. Raja Peary Mohun Mukerjee, C.S.I., then proposed the resolution standing in his name. "That a sub-committee "consisting of three members of the Council be appointed for" "the purpose of examining the Rules of the Society and" "suggesting amendments therein."

Seconded by Mr. W. D. Cruickshank.

On a poll being taken all members voted in favour of the resolution.

With a vote of thanks to the Chairman the meeting closed.

AGRICULTURAL AND HORTICULTURAL SOCIETY OF INDIA.

The Ordinary Monthly Meeting held at the Metcalfe Hall, on Wednesday, the 11th July, 1900, at 4-30 p.m.

Present:

MR. H. C. EGGAR, *President, in the Chair.*

MR. H. ST. J. JACKSON.
MR. A. K. BASU.
MR. W. D. CRUICKSHANK.
RAJA PEARY MOHUN MUKERJEE, C. S. I.
BABU JOY GOBIND LAW, C. I. E.

MR. P. LANCASTER, *Secretary.*

Visitors: Messrs. N. GILL, and C. L. D. Judge.

The following were proposed and elected ordinary Members:—

Mr. G. Kingsley, Ghurallee Tea Estate, Parbuttia, Jorhat, Assam, proposed by Mr. C. T. Jessop, seconded by Mr. H. St. J. Jackson.

Mr. H. V. Cowley, Borholla Tea Estate, Barnagaon, Jorhat, Assam, proposed by Mr. C. T. Jessop, seconded by Mr. A. K. Basu.

Mr. H. S. Attfield, A. B. Railway, Oating, Golaghat, Assam, proposed by Mr. C. T. Jessop, seconded by Mr. W. D. Cruickshank.

Mr. J. B. Fuller, I.C.S., C.I.E., Commissioner of Jabalpur, C. I. proposed by Mr. H. C. Eggar, seconded by Raja Peary Mohun Mukerjee, C.S.I.

Mr. M. M. Hadow, Dibrugarh, Assam, proposed by Babu Joy Gobind Law, C.I.E., seconded by Mr. H. St. J. Jackson.

The Hon'ble Mr. Justice H. F. Blair, Allahabad, proposed by Mr. W. D. Cruickshank, seconded by Mr. H. C. Eggar.

The Manager, Deamoolie Tea Co., Ld., Doom-Dooma, Dibrugarh, Assam, proposed by Mr. H. St. J. Jackson, seconded by Mr. A. K. Basu.

Mr. E. H. Stone, Chief Engineer, East India Railway, 4/2 Camac Street, proposed by Babu Joy Gobind Law, C.I.E., seconded by Raja Peary Mohun Mukerjee, C.S.I.

The Administrator, Bastar State, Jagdalpur, *via* Raipur C. P., proposed by Mr. W. D. Cruickshank, seconded by Mr. H. C. Eggar.

CONTRIBUTIONS.

Journal of the Asiatic Society of Bengal, Vol. LXIX, Part II, No. 1 of 1900. From the Society.

Proceedings of the Asiatic Society of Bengal Nos. V and VI., for May and June 1900. From the Society.

Journal of the Royal Agricultural Society of England third series, Vol. II, part 2, No. 42, dated 30th January 1900. From the Society.

The Chemist and Druggist, Vol. LVI, Nos. 1062 to 1068 for June and July 1900. From the Editor.

The American Florist, Vol. XV, Nos. 624 to 630. From the Editor.

The Indian Gardening, Vol. VI, Nos. 24 to 26 and Vol. 7, Nos. 1 to 4 of June and July 1900. From the Editor.

The Planter, Vol. VIII, Nos. 24 to 26, New Series and Vol. IX, Nos. 1 to 4 for June and July 1900. From the Editor.

Indian Sportsman, Vol. II, Nos. 27 to 33. From the Proprietor.

Annual Administration Report of the Forest Department of the Madras Presidency for the 12 months ending 30th June 1899. From the Superintendent, Government Press Madras.

Sixteenth Annual Report of the Department of Land Records and Agriculture, Bombay Presidency for the year 1898-99. From the Director.

Revue des Cultures Coloniales, Vol. VI, No. 53 dated 20th May 1900. From the Director.

The Agricultural Ledger, Nos. 2 and 3 of 1900 2 copies each. From Government of India.

The Perak Government Gazette, Vol. XIII, Nos. 14 to 17 and 18 1900. From Government of Perak.

Bulletin de la Societé Imperiale des Naturalists de Moscou. From the Society.

The Indian Forester, Vol. XXVI, Nos. 5 and 6 for May and June 1900. From the Editor.

The Sugar Cane, Vol. II, Nos. 18 and 19 for June and July 1900. From the Editor.

Sixth Annual Report of the Fruit Experiment Station of Ontario 1899. From the Editor.

Thirty first Annual Report of the Fruit Growers' Association of Ontario. From the Editor.

The May Flower for June and July 1900. From the Editor.

Agricultural Bulletin of the Malay Peninsula, No. 9 for May 1900. From the Director.

Moth Borer in Sugar Cane. From the Commissioner of Agriculture, West India.

Administration Report on the Jails of Bengal for the year 1899. From the Government of Bengal.

Introduction to the Annual Accounts of the Sea-Borne Trade and Navigation of the Bengal Presidency and of its Chief Ports and each of its subordinate Ports for the official year 1899-1900. The Collector of Customs.

The Canadian Horticulturist for June 1900. From the Editor.

West Indian Bulletin, Vol. I, No. 3. From the Director.

Bulletin of the Botanical Department, Jamaica, New Series Vol. VII, Part III. From the Director.

Bulletin of Miscellaneous Information. From Royal Garden, Kew.

The Agricultural Ledger, Nos. 4, 5 and 6, 2 copies each. From Goverment of India.

General Report on the work carried on by the Geological Survey of India for the period from the 1st April 1899 to the 31st March 1900. From Government of India.

Planting in Tobago. Imperial Department of Agriculture for the West Indies 1900. From the Commissioner.

PRESENTATIONS.

The Superintendent, Royal Botanical Garden, Calcutta.—
26 *Packets of seed.*

Mr. H. E. Abbott. Patory—
Six plants of the fingered Citron.

Exchanges.—During the past month little has been done in the matter of exchanges, beyond exchange of plants and seeds with various gardens in Ceylon, Mauritius, Natal and Port Blair.

References.—Since last meeting the Society has received 146 references on Horticultural subjects, 78, on Agricultural and 24 references from various Government offices. The chief items being Acmé 6, Agaves 2, Aermotors 2, Bulbs 5, Bamboos 2, Cannas 14, Caladiums 2, Casuarinas 2, Creepers 2, Ceara-rubber 2, Cacti 2, Cotton 4, Coffee 3, Eucalyptus 2, Fruit Trees 13, Ferns 4, Guinea Grass 2, Grevillea 3, Ichthemic 9, Lawns 2, Maize 6, Mushrooms 2, Ornamental plants 47, Orchids 3, Paspalum dilatatum 2, Pineapples 5, Pines 2, Pulses 2, Palms 3, Preservative (wood) A 2, Roses 9, Roadside Trees 3, Reana 12, Rhea 11, Sansevierias 7, Specifications 1, Villebrunea integrifolia 2.

Twenty seven botanical specimens were submitted for identification.

Lilium tigrinum splendens.—Two flowering stems of this Lily were sent up from the Society's gardens, the bulbs were received from Japan in November and immediately planted, the plants commenced flowering on the 15th June in the open, but slightly shaded. The flowers are large, orange-salmon in colour, the petals profusely spotted with large chocolate coloured dots, bulbils appear in the axil of each leaf.

Clematis paniculata.—A spray of flowers four-and-a-half feet in length of this new, quick growing Clematis was exhibited. Plants were received from Japan at the end of last year, and in December a couple were planted against two of the "Aermotor" uprights; one has now attained a height of

about 25 feet, at least fifteen feet being covered with its pure white, scented flowers, the second plant is about ten feet high but with innumerable branches and bears flowers to within two-and-a-half feet of the ground. A plant in a six-inch pot was also exhibited, having two shoots nine inches high and bearing flowers on the last five inches of both shoots.

Proposed Experimental Cultivation of the Tea-plant at the Gardens of the Society at Alipur.

Mr. H. St. J. Jackson, read the following short paper.—During my recent visit to the Eastern Duars I took the opportunity of observing closely the conditions under which Tea is cultivated, that is, as to soil, climate and rainfall. I noticed that while the temperature during the hottest part of the day (in the rains) rarely exceeds 85 degrees Far., the atmospheric pressure was almost as great as it is in and around Calcutta. That is to say, the feeling of oppressiveness was about the same as is experienced in the neighbourhood of Calcutta. The rainfall is certainly heavier than we are accustomed to, while the soil in the lands cleared of forest is a rich dark loam, with a large proportion of decayed vegetable matter, which may be described as humus. On some of the estates visited the soil was a light coloured alluvial loam. On both descriptions of soil the tea bush was growing with equal vigour. The elevation of the gardens visited by me ranged from 3 to 500 feet above sea level.

At Mogalhât Station where passengers change into the Cooch-Behar State Railway, I found the indigenous Manipuri tea plant growing luxuriantly. Cooch Behar is not much higher than Calcutta and has about the same climate. The few plants of tea I saw may have been "escapes," that is, some tea seed may have been designedly sown, and these were "escapes." This fact set me thinking whether it was

possible to grow tea in the plains of Bengal within easy reach of railway communication. The only question to be settled would be the quality of the manufactured article, and this point could not be set at rest without actual experiment.

I travelled down to Calcutta with a well-known Tea planter of the Duars and discussed the question with him. He thought there was something in the idea. He took a note of the general character of the soil on which luxuriant crops of jute were growing, and he thought that the soil was good enough for tea. The only draw-back he could see was the danger of the land being flooded during the monsoon. If, however, land not liable to floods could be found in the plains between Calcutta and Jalpaiguri within easy reach of railway communication, he thought it would be possible to grow the Tea bush successfully, but whether the leaf when manufactured would possess the quality of Duars Teas, could only be ascertained by actual experience.

It has occurred to me that if the Agricultural-Horticultural Society of India could see its way to conducting an experiment on a small scale with the several varieties of Tea grown in the Assam, Cachar, Sylhet, and Duars districts, the question might be solved; and if it was possible to grow any of the Teas I have named, I have very little doubt that one of the Tea-machinery firms in Calcutta would perhaps be able to place working models of their rollers, dryers, breakers and sifters at the disposal of the Society for the purpose of making the leaf into commercial product. A small withering house would have to be erected. In fact, a working model of a complete Tea factory would have to be erected in order to carry out the experiment thoroughly.

The result of such an experiment would probably have far-reaching effects if it proved a success.

There are so many Tea agency houses in Calcutta, the members of which are also members of the Society, that their active co-operation might, I think, be obtained in furthering such an experiment. I am aware that there are difficulties in the way of carrying out such an experiment and I am prepared to hear members present here to-day say that no useful purpose would be secured by conducting an experiment that may cost the Society more than the results would be worth.

My contention, however, is that if it can be satisfactorily proved that the Tea plant can be successfully cultivated, and the leaf manufactured into a good quality of Tea, on the plains of Bengal, a very great step would be gained; because the cost of freight and other transit charges, which the product now has to bear before it can be placed at the port of shipment, would be very seriously reduced, not to mention the cost of clearing jungle and felling forests before the Tea bush can be planted.

I have in the above sketch given a very brief and sketchy outline of my idea; but if it is thought worthy of consideration, the detail could be worked out later on."

The Secretary was directed to forward the paper in original to the Indian Tea Association with a request for the opinion of its members on the feasibility of the proposed experiment.

Specimens of leaves and inflorescences of these two plants were laid on the table. The leaf and flower-spike of the former were taken from a plant in the Society's collection, this species has been in the Society's Gardens for over 20 years and has been known as *A. densiflora* and *A. multiflora*. The leaf and inflorescence of the latter were obtained from a plant

Acalypha densiflora
" *hispida.*

imported two years ago from Messrs. Veitch and Sons of London and was received with the ticket attached *Acalypha hispida* (*Sanderiana.*)

On the 2nd July identical leaves and flower-spikes were submitted to Major D. Prain, I. M. S., Superintendent Royal Botanic Gardens, Calcutta and Mr. H. St. J. Jackson, Editor and Proprietor "*Indian Gardening and Planting,*" for opinion. Dr. Prain wrote: "Many thanks for your note" "regarding the two *Acalyphas* sent down. Certainly, look-" "ing at them as Herbarium specimens, he would be a bold" "person who should venture to say he could distinguish" "them," Mr. Jackson returned the specimens with the following note :—"I can see just a trifle difference between" "the shade of colours. The large leafed specimen appears" "to be *A. densiflora*, and the other *A. hispida, not A. Sanderi*;" "neither of them is the true *A. Sanderi.*"

In answer to this Mr. Jackson was informed that the larger leafed specimen was *A. hispida*, and appeared to be the one put on the market by Messrs. Sander & Co., as *A. Sanderiana*. *A. hispida* was known to Paxton when he wrote his first Botanical Dictionary in the early sixties, the original plants of this species were sent to the Society by Messrs. Veitch & Sons, and that *A. densiflora* had been in the Society's Gardens for at least 20 years.

It is not recorded from whence *Acalypha densiflora* was obtained nor by whom it was named, references to various botanical works in the Society's Library do not reveal the fact of such a plant being known under the above name or as *A. multiflora.*

There seems to be considerable difference of opinion regarding the correct name of *Acalypha hispida* some being of opinion that this is distinct from *A. Sanderiana*, while others proclaim them to be one and the same plant. The

following extracts are interesting and would strengthen one in the belief that the latter name was given the plant through oversight.

Acalypha Sanderi, N. E. Brown (*n.s.p.*)—This is a very beautiful species of Acalypha, quite distinct from any other at present in cultivation. Most, if not all, of those that are cultivated are grown for their foliage, but the charm of this novelty resides in its long, drooping, female flower spikes, which are dense and bushy, like a squirrel's tail on a small scale, and of a beautiful, bright, rose madder colour, effectively contrasting with the uniform bright green of the leaves. Undoubtedly it is a very distinct and attractive plant, and will probably prove to be one of the most striking novelties of next season. It was discovered growing near the sea in the Bismarck Archipelago, by Mr. Micholitz, when collecting in that region for Mr. Sander. Mr. Micholitz states that it is a sun-loving shrub of strong growth, very floriferous, and that the beautiful flower spikes last a long time in perfection. At his request I have great pleasure in attaching to the plant Mr. Sander's name. The following are its botanical characteristics. A vigorous shrub, attaining a height of 10 to 15 feet. Leaves spreading, with pubescent petioles, 2 to 2½ inches long, and blades 5 to 5½ inches long, 3 to 3½ inches broad, ovate, acute, or shortly acuminate, rounded at the base and emarginate at the insertion of the petiole; the margin variably serrate, with obtuse teeth, that are large or small, or sometimes almost wanting on the basal half of the leaf; upper surface bright green and sparsely hairy, under surface paler green and nearly glabrous, except along the midrib and base of the principal nerves, which are more or less pubescent. Male flowers not seen. Female flower-spikes axillary, densely many-flowered, drooping, the peduncle ¾ to 1½ inch long, the flowering part 4 to 8 inches long,

and ½ inch in diameter when fresh. Bracts minute, scarcely half a line long, ovate-acute, bearing clusters of three to five sessile flowers in their axils. Bracteoles very minute. Perianth segments half a line long, ovate-acute, green, ciliate, with white hairs. Ovary half a line in diameter globose-trigonous, green, densely covered with stiff white hairs. Styles three, divided to their base into numerous long filiform stigmas, of a bright rose madder colour, drying brown. Native of the Bismarck Archipelago.

Possibly the plant is dicœcious, as, so far as I am aware, only female flower spikes appear to have been produced on the introduced plants, the stock of which is in the hands of Messrs. F. Sander & Co. *N. E. BROWN* (*in Gardeners' Chronicle, October 3rd* 1896,.

NEW OR NOTEWORTHY PLANTS.

Among the "New Plants" shown at Ghent were the following:—

ACALYPHA SANDERI, *N. E. Brown* † (Fig. 93, p. 248.)

As this species has been already described in our columns, we need not enter into detail here, but merely note it as one of the most strikingly ornamental plants we have ever seen. Of branching habit, the branches spread widely, and throw down their long bright crimson spikes, like those of Love Lies Bleeding (12 to 18 inches long) beneath the broad ovate leaves in the most effective manner. To see a group of these plants at Messrs. Sander's, where one can look up at these crimson tassels, is to experience a sensation not to be forgotten. It was collected by Micholitz in the Bismarck Archipelago. (*Gardener's Chronicle, April 23rd*, 1898.)

Acalypha Sanderi?—It seems, according to the *Revue Horticole*, that Mr. Brown, of Kew, who named the above

† *Acalypha Sanderi*, N. E. Brown, in *Gardeners' Chronicle*, 1896 vol. xx., p. 392.

most beautiful and interesting plant, which made such a sensation when exhibited by Mr. Sander at the Ghent Quinquennial Exhibition last spring, was quite mistaken in pronouncing it to be a new plant, as it is only *A. hispida,* described by Sir Joseph Hooker long ago as a well-known Indian flowering plant, and of which a coloured drawing, dated 1812, exists in the library of the herbarium at Kew. Burmann describes it in his *Flora Indica* under the name of *A. caturus,* and it is also mentioned in a work of the same title by Roxburgh. Rumphius describes and figures it under the name of *Cauda felis,* or cat's-tail (*W. E. G. in Gardeners' Chronicle, August* 27, 1898).

Acalypha hispida. (*Sanderiana*).—The Acaliphas, hitherto known in British gardens, have been cultivated on account of their beautiful foliage. *A. hispida* is remarkable for the striking beauty of its long pendulous spikes of bright rose-carmine flowers that are produced all the year round, even in young plants. Although long known to science and to cultivation in India and Malaysia it has only recently been introduced into this country from New Guinea, and unfortunately distributed under the erroneous name of *A. Sanderiana.* It is a great acquisition as a stove plant, and as such has become deservedly popular (*J. Veitch & Sons, Ld., Catalogue of Plants.*)

In a further letter received from Dr. Prain he says "We have only three plants of *Acalypha Sanderiana.* Messrs. Sander sent out only one to us and it arrived dead. We got one other from Kew under the name of *A. hispida,* and from this we are propagating by *gooties,* when these are established I shall be glad to let you have one. We have two others that came from Malaya before the plant reached Sander at all. They were presented by Mr. C. Maries of Gwalior, who probably had them from his friend Mr. Curtis of Penang.

One of these I shall be glad to send you; but of course, the one from Kew when it is ready to be given you will be the more valuable as being an authentic example, at any rate of *A. hispida*."

The first mention of Acalypha in the *Gardeners' Chronicle* appears, strange to say, in Sir R. Schomburgk's report written in Hongkong in the year 1861, wherein he mentions the fact of *A. alnifolia* leaves being used for the adulteration of Tea by the irrepressible Chinese. A rather dangerous adulterant. The next mention of Acalypha is in connection with *A. tricolor* which was among the new plants exhibited in 1867.

The persistency with which *A. densiflora* and *A. hispida* produce their long, cord-like inflorescences is the chief feature of these extraordinary plants, and as they grow taller they produce fresh flower-spikes from the axil of each leaf. It would thus appear that so long as these plants are kept in a growing state so long will the inflorescences be produced.

Both plants appear to require all the moisture and sunshine they can get, to enable them to produce their long flower-spikes and develop colour.

Some plants of *A. densiflora* growing at the gardens in shade for years produced light copper coloured leaves with deeper veins and ribs, but now that some have been potted and are being treated and grown in the same way as *A. hispida* in full sunshine, the leaves are a little more copper coloured than this plant, the inflorescence is as long and at present of a similar colour.

Both plants receive a little bone-dust and ichthemic guano once a month and are well watered on dry days.

If it is possible to grow them into specimen plants six feet high and bushy in proportion, they would form excellent plants on the lawn.

THE AGRICULTURAL AND HORTICULTURAL SOCIETY OF INDIA.

The Ordinary Monthly Meeting held at the Metcalfe Hall, on Wednesday, the 8th August 1900, *at* 4-30 *p.m.*

Present:

Mr. W. D. Cruickshank, *Vice President, in the Chair.*
Mr. H. St. J. Jackson, Mr. P. Lancaster, *Secretary.*

The following were proposed and elected Ordinary Members :—

Mr. D. Weston, I.C.S., Barisal, proposed by Mr. J. H. E. Garrett, I.C.S., seconded by Mr. W. D. Cruickshank.

Mr. L. H. Turner, I.C.S., Partabgarh, Oudh, proposed by Mr. H. St. J. Jackson, seconded by Mr. W. D. Cruickshank.

The Manager, Nahorjan Tea Co., Ld., c/o Messrs. Geo. Henderson & Co., proposed by Mr. W. D. Cruickshank, seconded by Mr. H. St. J. Jackson.

Rejoined, Mr. E. C. Whitehead, Editor and Proprietor, "*The Planter*," 19-1, Bow Bazar Street.

Contributions.

The Chemist and Druggist, Vol. LVII, No. 1039, dated 21st July 1900. From the Editor.

The American Florist, Vol. XV, No. 631, dated 7th July 1900. From the Editor.

Indian Gardening and Planting, Vol. VII, No. 5, of 2nd August 1900. From the Editor.

The Planter, Vol. IX, New Series, No. 5, dated 4th August 1900. From the Editor.

The Indian Sportsman, Vol. II, No. 34, dated 4th August 1900. From the Editor.

The Perak Government Gazette, Vol. XIII, No. 23, dated 20th July 1900. From Government of Perak.

Returns of the Rail and River Borne Trade of Bengal during the Quarter ending the 31st March 1900. From Government of Bengal.

Annual Report on the Government Chinchona plantation and factory in Bengal for the year 1898-99. From Government of Bengal.

Indian Museum Notes, Vol. V, No. 1, 2 Copies. From Government of Bengal.

Bulletin of Miscellaneous information of the Royal Gardens, Kew, Appendix IV, 1900. From the Director.

Bulletin of the Botanical Department, Jamaica, New series, Vol. VII, Part VI, of June 1900. From the Director.

Revue des Cultures Coloniales, No. 56, VII of 1900. From the Director.

Bulletin de la Societé Imperiale des Naturalists de Moscou, No. 4 of 1899. The Society.

PRESENTATIONS.

The Royal Botanic Garden, Ceylon.

18 packets of seed.

The Government Botanist, Natal.

21 packets of seed.

The Superintendent, Government Horticultural Garden, Lucknow.

12 Plants.

Exchanges.—Since last Meeting there have been very few exchanges in the way of plants or seeds with other gardens.

References.—During the past month the Society has received 122 references on Horticultural matters, 309 on Agricultural and 86 from various Government Offices. The chief subjects being Acalypha hispida 5, Acmé Weed Destroyer 10, Aermotors 5, Atlas Preservative A. 4, Bamboos 2, Cannas 12, Coffee 2, Ceara rubber 4, Dyes 11, Fruit trees 22, Fibres 8, Ficus elastica 12, Ichthemic Guano 10, Manures 7, Maize 3, Nipal chilis 3, Ornamental plants 37, Paspalum dilatatum 231, Palms 5, Orchids 8, Rhea 5, Rubber 3, Sapota gutta 1, Tea 9, Tobacco 5, Vines 2, Vanilla 7.

Thirty-four botanical specimens were submitted for identification.

The proposed experimental cultivation of the Tea plant at the Society's Gardens at Alipur.—In terms of instructions issued at the last Meeting Mr. Jackson's Memorandum was sub-

mitted to the Indian Tea Association for opinion and the following reply was received :—

No. 444-0.

INDIAN TEA ASSOCIATION.

ROYAL EXCHANGE BUILDING,

Calcutta, 18*th July* 1900.

THE SECRETARY, AGRICULTURAL AND HORTICULTURAL SOCIETY OF INDIA.

DEAR SIR,

I am directed by the General Committee of the Indian Tea Association to acknowledge receipt of your letter dated 13th July with its accompanying copy of a paper by Mr. H. St. John Jackson in which he advocates the experimental culture of the tea plant at Alipur with the view of ascertaining whether tea could be grown on the plains of Lower Bengal. You ask for the views of the members of the Association upon the proposals made in the paper.

2. In reply I am to say that in the opinion of the General Committee the proposed experiments scarcely come within the province of this Association. They regret therefore that they do not see their way to take any action in the matter.

Yours faithfully,

H. W. HAYWOOD,

Assistant Secretary.

The paper was then forwarded to Messrs. Shaw Wallace & Co., who replied :—

3/7 CLIVE STREET,

Calcutta, 25*th July,* 1900.

THE SECRETARY, AGRICULTURAL AND HORTICULTURAL SOCIETY OF INDIA,

CALCUTTA.

DEAR SIR,

We thank you for your favour of the 20th instant with a memorandum by Mr. Jackson with reference to an

experimental Tea Garden. In our opinion we think it would be waste of money. It is known that tea will grow practically anywhere, but it can only be cultivated to a profit under certain favourable conditions, none of which are possessed in our opinion by the districts mentioned by Mr. Jackson.

Furthermore the present time, when the whole industry is feeling the ill effects of over production consequent on the large extensions put out during the last ten years, is, in our opinion most inopportune for exploiting fresh districts for the growth of tea,

We return Mr. Jackson's letter herewith.

We are, Dear Sir,

Yours faithfully,

SHAW WALLACE & Co.,

Messrs. Finlay Muir & Co., were then asked to favour the Society with an expression of their views on the subject and in answer they wrote.

Calcutta, 27th July, 1900.

THE SECRETARY, AGRICULTURAL AND HORTICULTURAL SOCIETY OF INDIA.

DEAR SIR,

We are in receipt of your letter of 26th instant enclosing a Memorandum read at the last Meeting of the Society by Mr. H. St. J. Jackson and asking our views as to the proposal therein made that the Society should have an experimental cultivation of the several varieties of the Tea plant at their gardens at Alipur with a view to ascertain, (A) whether it is possible to cultivate the tea plant on the plains of Lower Bengal say between Jalpaiguri and Calcutta

and, (B) whether a suitable quality of leaf could be manufactured therefrom.

In reply we have to say that we are not in favour of the proposal as although the experiments might be of scientific interest, they would serve no practical purpose. The position of the Indian Tea industry at present is not such as to justify the extension of Tea cultivation, and even were the plains of Bengal capable of producing tea equal in quality to that of the Dooars, which in our opinion is most improbable, and even if land of a suitable elevation could be obtained on favourable terms, which is unlikely, we do not think that any Capital would be forthcoming for the enterprise.

Yours faithfully,

FINLAY MUIR & Co.

The following reply has this day been received from Messrs. Begg Dunlop & Co. :—

Calcutta, 7th August 1900.

P. LANCASTER, ESQ., *Secretary.*

AGRICULTURAL AND HORTICULTURAL SOCIETY OF INDIA.

DEAR SIR,

We have to own the receipt of your favour dated 3rd instant covering a note from the Editor of "*Indian Gardening*" on the subject of an experimental cultivation of the several varieties of Tea plant at the Gardens of the Society at Alipore with a view to ascertaining whether it is possible to cultivate the Tea plant on the plains of Lower Bengal and whether a suitable quantity of leaf could be manufactured therefrom.

In reply we have to state, as regards an experimental cultivation of Tea at Alipore, that we understood the main

object of such an undertaking was the study of the plant and the Blights that attack it, by the Agricultural Chemist of the Indian Tea Association in conjunction with the experts of the Society and Dr. George Watt, C.I.E., Economic Reporter to the Government of India and as such we favor the proposal.

We do not see what is to be gained by extending the cultivation of Tea to the plains of Bengal as Mr. Jackson proposes even if climatic and other conditions are favourable, which we very much doubt. Moreover, there is plenty of land available in the Tea districts for the extension of Tea cultivation should the circumstances at any time warrant it. At present, as you are doubtless aware, the industry is suffering more or less from over-production and the fall of prices in recent years resulting therefrom has put a stop to all extensions, except on a very limited scale on existing Gardens.

We return Mr. Jackson's note as requested and are,

DEAR SIR,

Yours faithfully,

BEGG, DUNLOP & Co.

Previous attempts to cultivate the Tea plant at Alipur :— Many attempts have been made to cultivate the Tea plant at the Gardens of the Society for the purpose of grafting Camellias thereon but without success. Various jâts of seed have been tried and seedlings raised, but none survived for any length of time. A batch of seedlings were presented by Mr. E. C. Whitehead to the Society in 1894, these perished at the end of the rains although they were accommodated with space in the glass house. Mr. W. H. Miles two years later also contributed a number of young healthy plants

from the Duars but they also died, the difference in elevation, climate and soil has been against all attempts to establish any jât of Tea.

THE GUTTA OF ACPRAS SAPOTA.

Read the following letter :—

No. $\frac{2951}{32}$

INDIAN MUSEUM,

1, SUDDER STREET,

Calcutta, the 30th July 1900.

From GEORGE WATT, ESQ., M.B., C.M., C.I.E., ETC.,

Reporter on Economic Products

to the Government of India.

To

THE SECRETARY, AGRICULTURAL AND HORTICULTURAL SOCIETY OF INDIA, METCALFE HALL,

CALCUTTA.

SIR,

You are doubtless aware of the attempt that is being made to establish in this Museum an Economic or Commercial Gallery. I have the honour to invite the favour of your co-operation and assistance in carrying out the scheme.

We are presently working up the "Gums and Resins" Bay which also deals with Rubber and allied substances. For that purpose I shall be glad if you can supply me with fair sized samples of the gutta of *Achras Sapota*, along with good botanical specimens to correspond.

I may add that the matter was placed before Major Prain, I.M.S., but he has been unable to meet the

requirements of this office, Major Prain has accordingly referred me to you.

I have the honour to be,
SIR,
Your most obedient Servant,
G. W. WATT,
Reporter.

An attempt is being made to gather the *gutta,* which will be forwarded with complete botanical specimens to Dr. Watt.

Paspalum dilatatum.-At the suggestion of several members and others interested in the fodder question the Secretary of the Society forwarded to the Editor of "the Pioneer," extracts from the proceedings of the last Meeting, together with all available information regarding *Paspalum dilatatum.* In the issue of that paper dated the 22nd July the following appeared as a leaderette :—

At a recent meeting of the Agri.-Horticultural Society of India some very interesting details were given of a new fodder plant which deserves to be widely known. The plant is known as *Paspalum dilatatum*, and can, it is said, be grown with most profitable results upon all sandy wastes. It was introduced into Australia from South America, and Mr. A. Crawford, the dairy expert of the Department of Agriculture, Perth, Western Australia, writes : "The plant will, I think, prove an inestimable boon to us in this country, for millions of acres that are now to all intents practically useless would become valuable grazing properties." Planted in the poorest sandy soil at Subiaco, with no manure or attention, it grew all summer and at the end had put down its roots eighteen inches into the soil, and the grass was about the same height above. At Claremont, in a better class of sandy soil, without manure or water, it grew 3ft. 2in. high in three months, was then cut, and in six weeks was again over 2ft.

high. In all cases where experiments were made it kept green and grew right to the end of the summer. The Manager of an experimental station in New South Wales says it is probably the best fodder plant or pasture grass ever introduced into the district, resisting both heat and cold, and yielding enormous quantities of fodder, much liked by the stock. An instance is given of a farm of 100 acres, of which 53 acres were under this and other grasses. At the end of four months' drought, though all other grasses had disappeared, the *Paspalum dilatatum* enabled the farm to carry sixty-three head of large stock. Altogether the fodder seems an ideal one for India. The information about it has been gathered by the Agri-Horticultural Society at the instance of the Department of Land Records and Agriculture in Bengal, and the Society has a quantity of the seed available for free distribution. In these days when there are so many zemindars of education and intelligence ready to try any promising experiment, we are sure that the new fodder has only to be mentioned to ensure it a speedy trial.

The above notification has resulted in 231 references being received to date by the Society in the shape of telegrams, letters and post cards, to each of which a suitable reply was given as speedily as possible. The quantities required by various applicants ranged from "a few seeds" to "ten maunds," while others asked for sufficient seed "to sow on a small patch," the largest area required to be sown by one individual for experimental purposes being "500 acres." The supply of seed received for distribution was unfortunately small and was exhausted ere the end of the month, by which time 95 packets had been distributed.

A further consignment has been asked for, but as this species of Paspalum does not appear to produce much seed it will probably be some time before another supply is

received. Meanwhile great care is being taken of the young seedlings raised in the Society's Gardens, which have now attained an average height of six inches. These will be planted out in nurseries by the end of the month and induced to make all the growth possible with a view to splitting up the clumps for distribution next rains.

It has been repeatedly urged that the Society should experiment largely in the fodder section, but it should be remembered that in the humid climate of Lower Bengal there is never any dearth of fodder and the results of experiments conducted in this branch are of no practical use to any other parts of the country, the time, labour and money expended on such trials could with advantage be put to better and more useful purposes, indeed it may be said that the climate and soil of Calcutta nullify the value of the majority of experiments conducted in that district.

A note on the propagation of Ficus elastica.—Since the appearance of notifications in various leading newspapers to the effect that "corn-rubber" is eventually likely to prove a powerful rival to that produced by *Ficus elastica*, the Society has received numerous references on the subject of the propagation of this species, and the publication of the following letter which appeared in the issue of "The Pioneer" of the 30th July shows that the matter is being looked into.

"With reference to the notice of Mr. Ribbentrop's recent pamphlet on Forestry in your issue of the 5th instant and your remarks on the cultivation of *Ficus elastica* in Assam, I beg to enquire if any other method of propagation than that of raising plants from seed has been attempted. I ask this question, as in the gardens of the Agri-Horticultural Society at Calcutta I have noticed for some years that this

Ficus, as well as all other species, are propagated by *gootee*, stems and branches from two to fifteen feet in length are generally rooted in a month and are then either planted out or potted. The process is so simple that it may be illustrated in a few words. About the commencement of June healthy stems and branches of ripe wood are selected, a ring of bark varying from one to three inches in width, according to the size of the stem to be treated, is completely taken off, generally below a leaf-bud. A ball of earth worked into the consistency of clay is then placed all round the ring and somewhat above the upper cut and is secured by cleaned coir, the fine coir-matted like stuff found at the base of the leaves of certain palms, moss, old pieces of jute cloth or bagging, &c., and is bound round with string to secure the whole in position. Ere the rains commence a *callous* is evidently formed at the ends of the two cut parts of the bark and as the rains break roots are emitted from the base of the upper cut, when they have protruded three to six inches through the ball of earth, the stems and branches are cut and planted in the soil or in pots. The tree on which I saw this operation performed had about 500 *gootees* and was five years old, having itself been propagated by the above method. The tree was over 30 feet in height and measured a little over two feet in diameter a foot above the ground. Here was almost a ready-made tree which when planted was, I am told, about five feet in height, so that in five years it is possible in Calcutta to obtain indiarubber trees propagated as above at least 30 feet high and of a decent girth, which would no doubt yield a certain amount of rubber. The loss in the plants propagated is, I am told, practically *nil*. Probably if this method of propagating the indiarubber tree was tried in the Assam reserves and by tea planters a very large area of *Ficus elastica* could be planted out and should in seven to ten years yield a handsome revenue. It appears to be a diffi-

cult matter to raise the indiarubber tree from seeds, there is a great loss of seeds through heavy showers, &c., and then there is such a long waiting before the saplings are large enough to plant out, and years of weary waiting before the trees are old enough to produce their precious juice."

For a number of years this Ficus has been propagated in the Society's gardens in the manner indicated. From experience it has been found that branches two to three feet long are the most convenient sizes to propagate successfully, these produce roots rapidly and can be cut off from the parent stem in two to four weeks from time the operation is performed, according to the state of the weather. The small tree in the Society's gardens can easily produce 500 young plants annually, but from the old giants in the Assam forests from one to three thousand might be taken off each year.

These young plants could at once be put into the ground selected for the plantation, and in the following rains the central shoot of each plant could be *gooteed*, in this manner each of the young trees of the previous year's planting would produce another rooted plant which could be put into the plantation at once, this operation of *gootceing* would cause the young mother plants to throw out lateral branches. The plants propagated in the second year would in the following season be capable of producing a rooted plant from the central stem, these in turn would be planted out the first and second years plants being allowed to develop into trees and would in all probability be ready to tap in seven to ten years. In the manner above described an unlimited number of young trees could be raised and planted out annually.

There is another method of propagating this tree on an even larger scale that could be made to yield young plants

all the year round, and which is extensively practised by Nurserymen in Europe where the plant is extensively used for room decoration.

It is as follows:—Make cuttings of the stem about six inches in length, taking care to have one leaf attached to each cutting if possible, these are inserted in hot beds under a frame, or inside of a propagating house and within one month each will become a well rooted plant; they can then be potted and placed under shelter until strong enough to plant out in favourable weather. In this way one hundred young plants could be raised each month within a propagating frame measuring say three feet square.

Propagation on a still larger scale than the above might with advantage be carried into effect on Tea Gardens, where a propagating glass-roofed house, or lean-to shed with a glass roof, could be erected adjoining the boiler house, of the factory, the waste hot water from the boiler being employed in heating the propagating beds in the glass house. Such a house would produce in the course of a year many thousand small plants, but larger plants could be secured by inserting cuttings of stems two to three feet in length, these might, however, take a longer time to root, but the resulting plants would be very much larger and stonger than if raised from small cuttings.

AGRICULTURAL AND HORTICULTURAL SOCIETY OF INDIA.

The Ordinary Monthly Meeting held at Metcalfe Hall, at 4-30, P.M., *on Wednesday the* 12*th September* 1900.

Present:

MR. H. C. EGGAR, *President, in the Chair.*

RAJA PEARY MOHUN MUKERJEE, C.S.I.
BABU JOY GOBIND LAW, C.I.E.
MAJOR D. PRAIN, I.M.S.
MR. W. D. CRUICKSHANK.

MR. P. LANCASTER, *Secretary.*

The following were elected Ordinary Members:—

Syed Nawab Ali Chaudhuri, Dhanbari, Mymensing, proposed by Raja Peary Mohun Mukerjee, C.S.I., seconded by Babu Joy Gobind Law, C.I.E.

The Manager, Budla-Beta Division, Budla-Beta Tea Co., Ld., Dum-Duma, Assam, proposed by Mr. P. Lancaster, seconded by Major D. Prain.

Kuar Jevandass, Zemindar, Jabalpur, proposed by Major D. Prain, I.M.S., seconded by Babu Joy Gobind Law, C.I.E.

The Superintendent, Cooch Behar State, Cooch Behar, proposed by Major D. Prain, I.M.S., seconded by Mr. W. D. Cruickshank.

The Superintendent, State Gardens, Bhopal, proposed by Major D. Prain, I.M.S., seconded by Babu Joy Gobind Law, C.I.E.

The Manager, East India Coal Co., Ld., c/o Messrs. Jardine, Skinner & Co., proposed by Babu Joy Gobind Law, C.I.E., seconded by Major D. Prain, I.M.S.

The Assistant Manager, East India Coal Co., Ld., c/o, Messrs. Jardine, Skinner & Co., proposed by Raja Peary Mohun Mukerjee, C.S.I., seconded by Major D. Prain, I.M.S.

Mr. Burnet Landreth, Bristol, Pennsylvania, U. S. A. was elected a Corresponding Member.

Contributions.

The Chemist and Druggist, Vol. LVII, Nos. 1070 to 1074, for July and August 1900. From the Editor.

The American Florist, Vol. XV, Nos. 632 to 636, for July and August 1900. From the Editor.

The Canadian Horticulturist for July and August 1900. From the Editor.

The Indian Gardening, Vol. VII, Nos. 6, 7, 8, 9, and 10, for August and September 1900. From the Editor.

The Planter, Vol. IX, New Series, Nos. 5 to 9, for August and September 1900. From the Editor.

The Indian Sportsman, Vol. II, Nos. 35 to 39, for August and September 1900. From the Proprietor.

Proceedings of the Asiatic Society of Bengal, No. VIII, for July 1900. From the Society.

The Sugar Cane for August 1900. From the Editor.

Indian Museum Notes, Vol. IV, No. 6. From Government of Bengal.

The Perak Government Gazette, Vol. XIII, Nos. 24 and 25, for July and August 1900. From Government of Perak.

Report on the Progress and Condition of the Government Botanical Gardens, Saharanpur and Aringadah for the year ending 31st March 1900. From the Director.

Report on the Government Horticultural Gardens, Lucknow for the year ending 31st March 1900. From the Director.

Working plan of the Experimental Farm and other lands at Cawnpore. From the Director.

Report of the Director of the Botanical Survey of India for the year 1899-1900. From the Director.

The Indian Forester, Vol. XXVI, No. 7, for July 1900, From the Editor.

The May Flower for August 1900. From the Editor.

The Journal of the Royal Horticultural Society, Vol. XXIII, part 3 for August 1900. From the Society.

Year book of the Department of Agriculture 1899, 2 copies. From Commissioner of Agriculture, Washington.

Technical Series No. 8, U. S. Department of Agriculture. From the Director.

Annual Statement of the Sea-borne Trade and Navigation of the Bengal Presidency and of its Chief Port and each of its Subordinate Ports with Foreign Countries for the official year 1899-1900, Vol. I. From the Collector of Customs.

The Agricultural Ledger from No. 7 to 13, 2 copies each. From Government of Bengal.

Revue des Cultures Coloniales, Vol. VII, Nos. 58 and 59. From the Director.

Proceedings of the Asiatic Society of Bengal, No. VIII, of August 1900. From the Society.

Journal of the Asiatic Society of Bengal, Vol. LXIX, Part 1, No. 1 of 1900. From the Society.

Bulletin of the Botanical Department, of Jamaica, New Series, Vol. VII, Part VII, July 1900. From the Director.

Annual Report of the Public Gardens and Plantations for the year ended 31st March 1900. From the Director.

Park and Cemetery and Landscape Gardening, Vol. X, No. 5 July 1900. From the Editor.

Queries with answers from Landreth's Book of Enquiries upon Agricultural and Horticultural subjects. From Messrs. D. Landreth and Sons.

PRESENTATIONS.

The Superintendent, Royal Botanic Garden, Calcutta—

Four packets of seed.

The Superintendent, Government Agri-Horticultural Gardens, Lahore—

Two packets of seed.

The Superintendent, Government Horticultural Garden, Lucknow—

Eighteen plants.

The Superintendent Botanical Gardens, Ceylon—

Twelve packets of seed.

Exchanges.—Since last Meeting the Society has exchanged plants and seeds with gardens in India only.

References.—The number of references to the Society since the date of last Meeting is as follows:—Agriculture 352, Horticulture 211, from various Government Officers 43. The chief items being Aermotors 3, Arrowroot 7, Agaves 4, Acmé Powder Weed-killer 7, Albizzia stipulata 3, Atlas Preservative, A, 5, Bone-meal 9, Bamboo-seed 3, Barley 1, Bulbous plants 6, Casuarina 7, Cannas 18, Clematis 10, Diospyros discolor 7, D. Kaki 4, Elettaria Cardamomum 2, Fruit-trees 14, Flowering plants 17, Fibrous plants 6, Ferns 9, Forest-trees 6, Fodder 5, Furcræa gigantea 3, Grevillea 4, Green manuring 5, Holarhena antidysenterica 2, Ichthemic Guano 4, Indigo 5, Jatropha glandulifera 2, Laportea crenulata 3, Modiola decumbens 3, Maize 6, Manures 14, Niquas 6, Orchids 7, Ornamental plants 41, Paspalum dilatatum 184, Palms 11, Potato 5, Pineapple 5, Pineapple fibre 3, Quercus serrata 2, Opium 2, Rice 4, Rhea 4, Roses 21, Reana luxurians 6, Sansevierias 12, Sapota-gutta 5, Sithi 4, Sunflower-oil 3, Tea 6, Timber trees 7, Theobroma cacoa 7, Tobacco 7, Wheat 2, Water analysis 5.

Sixty-eight botanical specimens were received for identification.

The proposed experimental cultivation of the Tea plant at the Society's Gardens at Alipur.

Mr. Jackson's Memorandum together with the various letters published in the last Meeting's proceedings were laid on the table. It was directed that an experimental plot of about 24 plants be attempted in such part of the gardens where land is available, with a view to aid in the study of the Tea plant, its various *jats*, and the blights that attack them.

Messrs. D. Landreth & Sons' offer of Radish seed for Famine stricken tracts.

The following letter was read :—

BRISTOL, PENNSYLVANIA, U. S. A.,

9th August 1900.

P. LANCASTER, ESQ.,

SECRETARY, AGRICULTURAL AND HORTICULTURAL

SOCIETY OF INDIA, CALCUTTA.

DEAR SIR,

In view of the want of Seeds in parts of India, on account of the famine this Firm will gladly contribute, without charge, a quantity, a ton more or less, of Radish Seed, of winter varieties as Long White Spanish, Long Black Spanish, Round Black Spanish and China Winter, all of which produce roots as large as Turnips which will keep in edible condition for months.

The seeds which we offer we hold in excess of our demands and would be glad to address them to your Society if it or other authorities will accept them free on board steamer at the Port of New York.

Respectfully yours,

D. LANDRETH & SONS.

Messrs. D. Landreth and Sons' generous offer was directed to be passed on to the General Relief Committee, and the hearty thanks of the Society tendered to the firm for their offer.

Niquas.—Read following letter from the Editor and Proprietor, Indian Gardening and Planting :—

From

EDITOR AND PROPRIETOR,
Indian Gardening and Planting,
5/1, Council House Street.

To

THE SECRETARY, AGRI-HORTICULTURAL
SOCIETY OF INDIA.
Calcutta, 25th August 1900.

DEAR SIR,

I have the pleasure to hand you herewith a pint tin of the new insecticide, "Niquas," and will be obliged by your experimenting with it, and letting me know the result of your experiments as early as possible.

The point I wish to arrive at is whether it is *effective* as an insecticide without injuring the plants to which it is applied.

I will be glad to have a report at your early convenience, as to your trials with "Atlas Preservative A.," a drum of which I sent you some months ago.

Yours faithfully,
H. St. JOHN JACKSON,
EDITOR AND PROPRIETOR.

Experiments with this new insecticide had to be conducted under glass, as it was found that results in the open were decidedly negative, the solution being washed off after each shower.

Red-spider.—One application of the solution was made on plants with smooth leaves, such as *Alocasia Sedeni, A Watsoni*,

A hybrida and others rather bad with red-spider, in all cases the result proved satisfactory. Plants with hairy leaves such as *Acalypha Hamiltoniana*, *A. Godseffiana*, *A. hispida* and others required two applications, before the spiders were killed, owing probably to the difficulty in getting the leaves thoroughly wet in the first instance.

The solution in all cases was applied through a small syringe with a very fine rose.

White scale.—Several plants of *Cattleya Harrisoniana* were next tried, three applications being necessary before the insects were destroyed. These plants were, however, dipped in the solution and not syringed, so as to prevent any of the liquid reaching the roots. To remove the dead scale the plants were wiped with a soft rag.

Woolly louse.—A large plant of *Pereskia aculeata* with woolly lice was next taken in hand, and four applications were necessary before the insects were killed, the adult louse being slowest in dying, owing probably to the fluffy covering preventing the solution from reaching the body of the insect for some time.

The results of the experiments tend to suggest that two applications of medium strength are better than one of full strength, thus obviating any fear of damage to the tender leaves and shoots.

Atlas Preservative A.—At the request of the Director, Department of Land Records and Agriculture, Bengal, an experiment was conducted with the above preservative with a view to testing its merits in keeping away white ants from growing crops. The following is a report on experiments with the Atlas Preservative A.

Various wood and bamboo posts treated with Atlas Preservative A. five months ago, show no signs of being attacked by white-ants. The above stakes were placed in positions where posts had been each year renewed on account of destruction caused by the ants.

Experimental plant tickets, eighteen inches high made out of Kerosine cases, for the Sansevieria plantation were coated with this preparation *six months ago* and embedded in the ground to a depth of 9 inches, show no signs of being eaten. This wood after the smell of Kerosine oil has evaporated is particularly liable to the attacks of white-ants.

A plot of *Reana luxurians* grown for fodder was badly attacked, the living parts, of course, escaped but the old yellow basal leaves after once touching the ground formed regular nests for the ants. The plants were soon undermined, the roots suffered considerably and in the majority of cases a large number of roots rotted, thus affecting the natural growth. Two applications of the preservative drove the ants away and beyond causing a few of the lower leaves to turn yellow no damage to the crop seems to have resulted from this experiment.

Large clump of Acalyphas full of dead wood in the centre, forming an ideal lodgement for white-ants, received one application which cleared the pests without causing the clumps to suffer.

A bundle of dry date-palm leaves having been accidentally left in a moist spot soon attracted the attention of white-ants, but one application of the preservative speedily cleared the bundle and on the following day not a single ant could be found in the vicinity.

The Preservative has also been used as an indelible ink for writing the names of plants on zinc tickets with re-

markable success. In using a solution of blue-stone it was necessary to polish the zinc tickets in order to obtain a clear black mark when written on, but the polished surface speedily became oxidized and the superfluous solution when the ticket became wet invariably "ran," thus spoiling the effect. The Preservative can be used with a fine camel's hair brush or quill-pen on the unpolished zinc, the writing soon dries and remains clear. Tickets thus treated have been in use during the rains and are now as legible as when first treated.

GARDENING NOTES.

Short notes on, and descriptions of, Plants mentioned in the Society's revised Plant Lists published in July 1900. (Additional notes from Members in various districts will be gladly accepted).

Aberia caffra (Bixineæ).

The *Kei-apple* of Natal. This is a tall shrub said to be greatly used in Natal, Caffraria and in other parts of South Africa as a hedge plant. The fruit is large and acid, but when boiled becomes edible and can be converted into preserves. Sim says that they are suitable for drying by which process the sourness is lessened. The plant can be propagated by layers, but has not yet produced fruit in the Society's gardens, where the shrub is known to the *malis* as *Kafir Kanta*).

Abroma (*Sterculiaceæ*, Known as *Abrome* and to the natives as *Ullat Kumbal*. Rather useful shrubs in a large garden where their lobed hairy leaves may be seen to advantage. Fibre of good quality is extracted from the bark.

augusta has somewhat dingy yellow flowers, native of India.

fastuosa produces purple flowers. New Holland. May be propagated by seeds.

Abrus (Leguminosæ). Variously known as the *Lone Pea. Rutti seed* and *Wild liquorice*; the native name is *Gungchi or Ratti.*

precatorius, a common delicate little creeper with pale-purple butterfly-shaped flowers. The seeds are bright scarlet with a black spot at the base, there is also a variety that produces whitish seed. Rosaries are made with the scarlet seeds and are used chiefly by Buddhists. The root is medicinal, having the properties of the common liquorice. The generic name is derived from *abros* soft in allusion to the softness of the leaves, the specific name is derived from its uses in prayer among the above sect. A Native of India. Propagated from seed.

Abutilon (Malvaceæ) often called *Crimson Mallow*, and known here as *Kanghi* or *Petari*, neither of which are correct.

marmoratum, a small shrub growing to a height of five feet producing erect rosy-crimson flowers marbled and veined with white. The generic name is derived from the Arabian name of a plant of the Marsh Mallow family, the specific name indicating the marbling on the flowers. Propagated from seeds and cuttings. A native of Central America.

Acacia (Leguminosæ). This genus is one of the largest known and contains many desirable species.

arabica. Indian Gum Arabic, Babũl, Babla, Kikar. A well known common tree, flowers whitish, foliage feathery.

Farnesiana. A tall shrubby bush bearing delightfully fragrant golden-yellow flowers. Often called the *West Indian Blackthorn*, though it is a native of India. Known to the natives as *Vilaiti Babul, Kasturi, Urimeda, Phitcumi* and *Gooya-babla.* Foliage feathery.

Houstoni. A tall ornamental shrub, the foliage is heavier than that of the two former species, bears almost all the year round large crimson bottle-brush shaped flowers. Propagated from layers and seeds. According to Nicholson the generic name is derived from *ac*, a point, in Celtic, or from *akazo* to sharpen, in allusion to the spines with which many of them are furnished.

Acalypha (*Euphorbiaceæ*). Commonly known by the generic name, or as *Copper Leaf*, among malis too the generic name is greatly used, some times the genus is spoken of as *Vasanti*, or *Lalmukhtajhuri.* The most desirable coloured foliage species are *A. glabrata, A. Godseffiana, A. Hamiltoniana, A. Macafeeana, A. musaica, A. tricolor. A. densiflora* and *A. hispida* (*A. Sanderiana*) deserve the attention of all growers on account of their long drooping spikes of flowers. The former has flowers of a deep rose-madder colour, while in the latter the flowers are of a lighter colour, the spikes commonly attain a length of 12 to 20 inches here in the hot weather and rains.

Acanthus (*Acanthaceæ*). This is a fairly large genus of more or less spiny plants, hence the generic name.

The family is generally known as the Bear's Breech. *ilicifolius.* The Holly-leaved Acanthus, called by malis *Harcuch kanta.* A dwarf prickly shrub with blue flowers, propagated by seeds or division of the roots in the rains.

Achania (*Malvaceæ*) A member of the Mallow family containing mucilage to a considerable degree.

Malvaviscus The Purple Cotton, sometimes called *Lal-Kapas* but both names appear to be wrong. An evergreen shrub with purplish flowers of little interest, propagated by seeds, layers and cuttings in the rains. Nicholson catalogues it as *Malva arboreus.*

Achimenes (*Gesneraceæ*) The generic name is said to be derived from *cheimaino,* to suffer from cold, in allusion to the tenderness of the species. This is a large genus of handsome herbaceous perennials with scaly catkin-like tubercles. The flowers in colour run from white into pale pink, rose, scarlet, lilac and violet. The plants are of easy culture, preferring a somewhat rich open soil with plenty of heat and moisture in their growing season, they however appear to flower better in Upper Bengal and the North-Western Provinces than in Lower Bengal. The tubers should be planted in March or April in rich soil mixed with plenty of sand, and watered frequently until growth starts when water in abundance may be given. Propagated by seeds, layers, cuttings of stems, division of roots and seeds. Achimenes are beautiful basket plants, especially if a judicious mixture of colours are planted.

Adansonia (*Sterculiaceæ*) *The Baobab-tree, or Sour Gourd* is supposed, as far as girth is concerned, to be the largest

tree in the world though it grows only to a height of fifty to eighty feet.

digitata. Known in the vernacular as *Gorakha-amali*, a very slow-growing ornamental tree. The flowers are said to be white, six inches across, with purplish anthers. The leaves are palmate and by a stretch of imagination the specific name, which means finger-like has been given to this tree. Propagated by seeds. The generic name was given in honour of Michael Adanson an eminent French botanist. Africa is given as its habitat.

Adenanthera (*Leguminosæ*) *The Coral Pea*, or *Peacock Flower Fence.*

pavonia. A fairly large tree which if kept pruned forms a handsome bush. Flowers yellow, the ripe seeds are a bright scarlet, the tree is known in this part of the country as *Rakhta-chandana.* The generic name is given on account of the gland-like termination of the anthers, the specific name means peacock, or peacock-like, in allusion to the shape of the flowers. Propagated by seeds, a native of India.

Adhatoda (*Acanthaceæ*) *vasica.* The generic name is said to be that by which it is known in some parts of India, the same is the case with the specific name, it is also known as *Arusa* and *Bakas. The Indian Bower Plant*, a shrub growing to a height of 5-6 feet, bearing purplish flowers. Propagated by cuttings.

Ærua (*Amarantaceæ*) *The Red Leaf* called by some *Chaya.*

sanguinolenta. A small plant with dull-red leaves and stems, often used as an edging and requires to be kept cut. The generic name is said to be what the Arabs called the plant, the specific name alludes to the blood colour of the plant. Propagated by cuttings.

Agati (*Fabaceæ*) It is curious that this should be called the *West Indian Pea* for it is an East Indian tree.

coccinea flowers red, *grandiflora* flowers rosy-red, *grandiflora flore-ablo* flowers white, somewhat double.

The flowers are very interesting and pretty, but as the plant speedily grows into a tree its unsightly long bare stems spoil the effect of its light feathery leaves among which the flowers hang down. The generic name is said to be derived from the Sanscrit *Agasti*, it is also known as *Bûk* and *Bok*. Propagated from seeds and gooties.

Agave (*Amaryllideæ*) Commonly known as *American Aloes* though in no way related to the aloe, these plants are known in the vernacular as *Rakas-pattah*, *Banskeora*, *Hathisengar*, *Jangli-ananash*, and *Wilayati-anaras*.

americana, *americana variegata*, *lurida*, *rigida var. sisalana*. These are all, more or less, large, fleshy, thorny edged leaved plants, forming excellent specimens for large lawns. The variegated variety when small can be worked very effectively into beds, the ivory stripes on the leaves contrasting strongly with the green. All are fibrous plants producing unattractive greenish flowers. *A. sisalana* yields the *Sisal*, or *Henequen* hemp. Propagated by suckers or seeds. Natives of Central and South America. The generic name is derived from *aganos*, admirable.

Aglaia (*Meliaceæ*) The *Chu-lan Tree* of China, known in the vernacular as *Late-mahawa*.

odorata. A small bushy tree producing small yellowish sweet-scented flowers, with which the Chinese are said to scent their tea. Named in honour of Aglaia one of the three Graces.

AGRICULTURAL AND HORTICULTURAL SOCIETY OF INDIA.

The Ordinary Monthly Meeting held at the Metcalfe Hall, on Wednesday, the 14th November, 1900, at 4 P. M.

Present:

MR. H. C. EGGAR,

President, in the Chair.

MR. F. G. CLARKE.
MR. J. R. BERTRAM.
BABU JOY GOBIND LAW, C. I. E.
RAJA PEARY MOHUN MUKERJEE, C. S. I.
MR. G. GIRARD.

MR. P. LANCASTER, *Secretary.*

The following were proposed and elected Ordinary Members :—

Mr. E. S. L. Morton, Agent, Panjab Bank Ld., Simla, proposed by Major J. McDermott, seconded by Mr. H. C. Eggar.

Mr. C. R. Wilson, Principal, Patna College, Bankipore, proposed by Mr. G. L. Searight, C. E., seconded by Mr. G. Girard.

CONTRIBUTIONS.

Annual Report of the Department of Land Records and Agriculture, Assam, for 1899-1900. From the Director.

The Gardening Circular, Vol. VII, No. 4, for October 1900. The Secretary.

Annual Report of the Bengal Veterinary College and of the Civil Veterinary Department, Bengal, for the year 1899-1900. From Government of Bengal.

Annual Report of the Tenasserim Agri.-Horticultural Society, Moulmein for 1899-1900. From the Society.

The Indian Forester, Vol. XXVI, Nos. 8, 9 and 10, for August to October 1900. From the Editor.

Report on the Administration of the Police of the Lower Provinces, Bengal Presidency for the year 1899. From Government of Bengal.

Annual Report of the Sibpur Experimental Farm, for 1899-1900. From Government of Bengal.

Report of the Alipur and Hazaribagh Reformatory School, for the year 1899. From Government of Bengal.

Returns of the Rail and River Borne Trade of Bengal during the quarter ending 30th June 1900. From Government of Bengal.

Memorandum on the Orginization of Indian Museums by Geo. Watt, Esq., 2 Copies. From Government of India.

Bulletin No. 6, Department of Land Records and Agricultrue, Bengal, of 1900. From Government of Bengal.

West Indian Bulletin, Vol. I, No. 4. From the Director.

Bulletin of the Botanical Department, Jamaica for October 1900. From the Director.

The Canadian Horticulturist, for October 1900. From the Editor.

From Government of India, Revenue and Agricultural Department, 5 Copies each :—

Memorandum on the prospects of the Sugar Cane, Cotton, Wheat, Sesamum, Rice and Indigo Crops, for 1900.

Memorandum on the prospects of the Cotton, Sesamum, Wheat, and late Cotton Crops, for 1900. From Director, Department of Land Records and Agriculture, Bombay.

Memorandum on the prospects of the Indigo and Jute Crops for season 1900. From the Director Department Land Records and Agriculture, Bengal.

Memorandum on the prospects of the Rapeseed, Til, Sugarcane, Cotton and Wheat Crops, for 1900. From the Director, Department of Land Records and Agriculture, N. W. P. and Oudh.

Memorandum on the prospects of the Paddy, Cotton Indigo, Sugar Cane and Jingily Crops, for the Season 1900, 5 Copies. From the Director, Department of Land Records. and Agriculture, Madras.

The Chemist and Druggist, Vol. LVII, No. 1075 to 1083, September and October 1900. From the Editor.

The American Florist, Vol. XVI, Nos. 637 to 645, from August to October 1900. From the Editor.

The Indian Gardening and Planting Vol. VII Nos. 11 to 18, September to November 1900. From the Editor.

The Planter, Vol. IX, Nos. 10 to 19, from September to November 1900. From the Editor,

The Indian Sportsman, Vol. II, Nos. 40 to 48, from September and November 1900. From the Proprietor.

Forestry in British India. By B. Ribbentrop, Esqr. C. I.E. From Government of India.

Bulletin of the Botanical Department, Jamaica, new Series Vol. VII, parts VIII, and IX 1900. From the Director.

Bulletin of the Department of Land Records and Agriculture, Bombay, No. 20. From the Director.

Report on the operations of the Department of Land Records and Agriculture, Madras Presidency for the official year 1898-99. From the Director.

The Perak Government Gazette, Vol. XIII, Nos. 29 to 34, for September and October 1900. From Government of Perak.

Revue des Cultures Coloniales, Tome. VII, Nos. 60, 61, 62 and 63 of September and October 1900. From the Director.

Bulletin Nos. 24 and 25, New Series, U. S. Department of Agriculture, Washington, 2 Copies. From the Director.

Journal of the Royal Agricultural Society of England, Third Series, Vol. II, Part III, No. 43, dated 29th September 1900. From the Society.

Journal of the Asiatic Society of Bengal, Vol. LXVIII, Part 1st, Extra No. 2 of 1899, and Maps of Ancient Kashmir and Srinagar. From the Society.

Report of the Department of Land Records and Agriculture, Bengal, for the year ending 31st March 1900. From Government of Bengal.

Report on the Operations of the Department of Land Records and Agriculture, Central Provinces, for the year ending 30th September 1899. From the Director.

Annual (Report) Note on Crop Experiments in Assam, for 1899-1900. From the Director.

PRESENTATIONS.

The Government Botanist, British Guiana—

One packet of seeds.

The Superintendent, Raj Darbhanga Gardens—

One packet of seeds.

Sir C. C. Stevens, K. C. S. I. London—

One packet Jersey Cabbage seeds.

Mr. G. L. Kemp Umballa.

One packet acclimatised Sweet Pea seed.

The Superintendent. Royal Botanic Garden, Calcutta—

One packet Villebrunea integrifolia seed.

Mr. G. L. Searight, C. E., Darjiling—

One bundle Geranium cuttings; one lot of Plants.

Mr. W. M. Gow-Smith, Madhupur—

One packet Cassia marginata,

One box plants.

The Superintendent, Lloyd's Botanic Garden, Darjiling—

One box Sphagnum species,

Two cases of Plants.

Messrs. J. Carter & Co., London—

Twenty four packets of seed.

Mr. W. J. Ager, Singtom, Darjiling—

Two packets of seeds.

Mr. V. A. Mackinnon, Mussoorie—

One packet Paspalum dilatatum seed.

The Hon'ble Mr J. Buckingham, C.I.E., Amguri, Assam—

One packet China Cabbage seed.

Messrs. Begg, Dunlop & Co., Calcutta—

Six packets of Tea seed from Amguri, Assam ;

One case of Tea seed, from Larsingah, Cachar.

Mr. W. Helps, Baintbari, Dam-Dim—

Six packets of seed,

One hundred and sixteen Plants.

Mr. W. Graham, Calcutta.

Two packets Palm seeds.

A selection of Tulip bulbs.

Mr. J. H. E. Garrett, C. S., Dinajpur.

One box of plants.

The Superintendent, Government Botanical Garden, Saharunpur.

One packet of seeds,

Mr. G. Foster, Calcutta.

One case Cactus Dahlia bulbs,

Mr. J. White, Darjiling.

One case of plants,

Exchanges. Since last meeting plants and seeds have been exchanged with various gardens in Ceylon, Natal, Australia, United States of America, Port Blair and in this Country.

References. The following is a list of references received by the Society since last Meeting, 256 being on Horticultural matters, 344 on Agricultural and 62 from various Government and Municipal offices :— Acme Powder Weed Killer. 8, Arrowroot. 6, Agricultural records. 12, Adhatoda vasica. 3, Bone-meal. 5, Biskutuli. 5, Buckwheat, 4, Cannas. 15, Clem-

atis 8. Camphor. 8, Cardamom. 3, Cotton. 3, Diospyros. 3, Erythroxylon Coca. 4, Eucalyptus. 3, Flax, 7, Fruit trees. 28, Ficus elastica. 9. Fibres various. 5, Fibre machines. 7, Garcinia. 2, Ichthemic Guano. 12. India Rubber. 5, Lupins for green manure 2. Lawn mowers. 4, Lucerne 6, Modiola decumbens. 3, Maize. 3, Niquas. 12, Oil cake, 2, Oats. 2, Ornamental plants. 187, Paspalum dilatatum. 144, Potatoes. 7, Rhea. 5, Sithi. 2, Singhara 2, Sanseveiria. 4. Sola. 4, Sunflower. 3, Silk cotton. 2, Tea (experiment). 4, Tobacco (samples). 5, Tans. 3, Tapioca. 3, Villebrunnea integrifolia. 4, Weed-killers various. 4. Thirty nine botanical specimens were submitted for identification.

Flower Show 1901. It has been decided to hold the Flower Show on Friday and Saturday the 15th and 16th February next on the Maidan, the Commissioner of Police having granted the Society permission to occupy the same site as last year.

The following is a list of Prizes offered to date.—H. H the Nawab Begum of Murshidabad. C. I. Rs. 50, Mr. T Inglis, C. S. Rs. 10. Mr. Sorabje Dadabhoy Dubash Rs. 20. Messrs. Sutton and Sons repeat the prizes offered last year, Raja Peary Mohun Mukerjee. C. S. I. Rs. 16. The Editor and Proprietor "Indian Gardening and Planting" repeats the prizes offered last year. Sree Maharaja G. N. Gujputeerao C. I. E. Rs. 32. The Manager, Himalaya Seed Stores Mussoorie, on behalf of the Ichthemic Guano Co. a bronze and silver medal. Rai Prosono Coomar Banerjee Bahadur Rs. 32. The Market Sub-Committee of the Calcutta Corporation Rs. 50, Maharaja Bahadur Sir Jotendro Mohan Tagore K. C, S. I. Rs. 32. Messrs. D. Landreth and Sons desire to repeat the prizes offered last year. H. H. the Nawab Bahadur of Murshedabad Amir-ul-Omrah Rs. 50,

The following is the revised schedule of prizes offered for competition by the Society :—The Grant Silver Medal. The Council's Silver medal and money prizes as below.

A Division.

1	Orchids, not less than 4 dissimilar kinds in flower	Rs. 5
2	Do best specimen in flower 1st Prize	„ 5
3	Do „ „ „ 2nd „ „ „	3
4	Roses, (in pots) Hybrid Perpetual, not less than 8 plants dissimilar kinds, in flower	„ 8
5	Do. „ „ Tea „ „ „ 8 „ „	8
6	Do. „ „ best specimen H. P. in flower	„ 5
7	Do. „ „ „ Tea „ „	„ 3
8	Ferns, 8 dissimilar kinds of Adiantum.	„ 8
9	Do. 12 „ „ „ other ferns.	„ 8
10	Do. best specimen Adiantum.	„ 5
11	Do. „ of any ofter kind.	„ 5
12	Begonias, best 12 dissimilar.	„ 5
13	Do. „ grown single specimen.	„ 3
14	Dracænas, not less than 12 dissimilar kinds.	„ 6
15	Dracæna, best grown specimen.	„ 4
16	Rare and handsome plants not before exhibited, 4 dissmilar kinds	„ 10
17	Do. „ Do. „ „ 2	„ 5
18	Camellias, stand of not less then 6 cut flowers.	„ 5
19	Roses (cut) „ „ 16 *choice* dissimilar H. P.	„ 10
20	Do. „ „ „ 16 „ do „ Tea	„ 10
21	Do. „ best single specimen	„ 3
22	Cut flowers, best collection of *choice* cut-flowers, other than annuals	„ 5
23,	Do. „ „ „ do cut-annuals.	„ 5
24	Bridal Bouquet of white flowers	„ 5
25	Ball Room Bouquet.	„ 5

A Division.—*Continued.* Rs.

26 Button hole best. „ 2
27 Tastefully arranged group of *well grown* annuals and perennials „ 10
28 Coleus, collection of 12 dissimilar *well grown plants* „ 4
29 Verbena, „ „ 6 „ *kinds in flower* „ 4
30 Dianthus, „ „ 6 „ „ „ „ „ 4
31 Pansy, „ „ 6 „ „ „ „ „ 4
32 Phlox, „ „ 6 „ „ „ „ „ 4
33 Petunia, „ „ 6 „ „ „ „ „ 4
34 Portulaca, „ „ 6 „ „ „ „ „ 4
35 Geranium, „ „ 6 pots „ „ „ „ 4
36 Nasturtium (Dwarf), 6 dissimilar „ „ „ „ 4
37 Mignonette, „ „ 6 pots „ „ „ „ 4
38 Heliotrope, „ „ 6 do „ „ „ „ 4
39 Poppy, „ „ 6 dissimilar „ „ „ „ 4
40 Margaret Carnation, 6 pots „ „ „ „ 4
41 Violet, „ „ 6 do „ „ „ „ 4
42 Creepers, „ „ 6 dissimilar „ „ „ 5
43 Bulbous plants, „ 8 „ „ „ „ „ 5
44 Flowering shrubs, „ 8 „ „ „ „ „ 5
45 Collection of not less than 30 pots of not less than 12 dissimilar kinds in flower „ 8
46 Do. „ „ „ 50 16 „ „ „ 15

B Division.

Rs.

1 Orchids, not less than 6 dissimilar kinds in flower 10
2 Do. „ „ „ 4 „ „ „ 5
3 Do. best specimen in flower, 1st Prize 5
4 Do. „ „ „ „ 2nd „ 3
5 Roses, (in pots) Hybrid Perpetual, not 'ess than 6 plants, dissimilar kinds, in flower 5
6 Do. „ Tea „ „ „ 6 „ 5

	B Division.—*Continued.*	Rs.
7	Ferns, not less than 8 dissimilar kinds of Adiantum	10
8	Do. „ „ „ 8 „ „ „ other Ferns.	10
9	Do. best specimen of Adiantum	5
10	Do. „ „ „ of any other kind.	5
11	Begonias, best 10 dissimilar kinds.	5
12	Do. „ grown single specimen.	3
13	Dracænas, not less than 6 dissimilar kinds.	5
14	Rare and handsome plants, not before exhibited 3 dissimilar kinds	8
15	Do. do. „ „ „ „ 2	5
16	Camellias, stand of not less than 6 cut flowers	5
17	Roses (cut) „ „ „ 12 *choice* dissimilar kinds.	10
18	Do. („) „ „ „ 6 do. „ H. P.	5
19	Do. („) „ „ „ 6 do. „ Tea	5
20	Do. („) best single specimen H. P.	3
21	Do. („) „ „ „ Tea	3
22	Cut flowers, best collection of *choice* cut flowers, other than annuals	10
23	Do. „ „ „ do. cut annuals.	10
24	Bridal Bouquet of white flowers.	6
25	Ball Room Bouquet.	6
26	Spray for Lady's hair.	5
27	Button hole, best	2
28	Tastefully arranged group of *well grown* plants, annuals and perennials	20
29	Coleus collection of 12 dissimilar *well grown* plants.	5
30	Verbena, „ „ 6 „ kinds in flower	5
31	Dianthus, „ „ 6 „ „ „	5
32	Pansy, „ „ 6 „ „ „	5
33	Phlox, „ „ 6 „ „ „	5
34	Petunia, „ „ 6 „ „ „	5

B DIVISION.—*Continued.* Rs.

35 Portulaca, collection of 6 dissimilar *kinds* in flower 5
36 Geranium, „ „ 6 pots in flower 5
37 Mimulus, „ „ 3 do. „ „ 5
38 Nasturtium (Dwarf), 6 dissimilar „ „ 5
39 Margaret Carnation, 6 pots „ „ 5
40 Dahlia, „ „ 3 do. „ „ 5
41 Mignonette, „ „ 6 do. „ „ 4
42 Hiliotrope, „ „ 6 do, „ „ 5
43 Do. Best specimen plant „ 3
44 Poppy, „ „ 6 dissimilar *well grown* plants in flower 5
45 Violet, „ „ 6 pots „ „ 4
46 Creepers, „ „ 6 dissimilar „ „ 6
47 Bulbous plants, „ 6 „ „ „ 6
48 Flowering shrubs „ 6 „ „ „ 6
49 Collection of not less than 25 pots, of not less than 8 dissimilar kinds of annuals in flower 10
50 „ „ „ „ 40 „ „ „ 12 16

FRUITS.

First Prizes.

Rs.

Pineapple, best plate of 3 3
Papaya, do. of 3 3
Bael, do. of 3 3
Cocoanuts do. of 3 varieties 3
Guavas, do. of 6 3
Lemons and Limes, best plate of 12, 3 varieties ... 3
Plums, long, do. of 50 3
Do. round, do. of 30 3
Plantains, do. of 6 varieties ... 6

FRUITS—First Prizes.—*Continued.*				Rs.
Pomeloes,	do.	of 6	... ...	5
Sapotas,	do.	of 12	... ...	3
Tipparees, small basket		...	... ...	3

Second Prizes.

				Rs.
Pineapple, best plate of 2			... ...	2
Papaya,	do.	of 2	... ...	2
Bael,	do.	of 3	... ...	2
Cocoanuts,	do.	of 2 varieties	... ...	2
Guavas,	do.	of 6	... ...	2
Lemons and Limes, best plate of 9, 3 varieties			...	2
Plums, long,	do.	of 30	... ...	2
Do. round,	do.	of 30	... ...	2
Plaintains,	do.	of 4 varieties	...	4
Pomeloes,	do.	of 4	... ...	2
Sapotas,	do.	of 8	... ...	2
Tipparees, small basket			... ...	3

VEGETABLES.

First Prizes.

Artichoke, best plate of 6 heads				... ...	4
Brocoli,	do.	of 4	do.	... ...	4
Beet,	do.	of 8	do.	... ...	4
Brussels Sprouts,	do.	of 6 heads		... ...	4
Cabbages,	do.	of 3 varieties		... ...	5
Cauliflowers,	do.	of 4	„	... ...	4
Capsicums,	do.	of 6 in 3 varieties		... ...	3
Carrots,	do.	of 12		... ...	3
Celery, best plate of 3				... ...	4
Cucumbers, do. of 2				.. ...	3

VEGETABLES—First Prizes.—*Continued.*

French Beans, in pod, best plate of 20	3
Knol-Khols, do. of 6	3
Lettuces, do. of 3 varieties ...	3
Indian Corn, in pod, best plate of 6	3
Peas, in pod do. of 50	5
Pot Herbs, best assortment	4
Tomatoes, best plate of 12	3
Potatoes, not less than 12	5
Turnips, do. 12	3
Best Dalli of Vegetables	10

Second Prizes.

Artichoke, best plate of 5 heads	3
Brocoli do. of 4 do.	3
Beet, do. of 6 do.	3
Brussels Sprouts, best plate of 5 heads	3
Cabbages, do of 3 varieties	3
Cauliflowers, do. of 3	2
Capsicums, do. of 6 in 3 varieties ...	2
Carrots, do. of 12	2
Celery, do. of 3	3
Cucumbers, do. of 2	2
French Beans, in pod, best plate of 20	2
Knol-Khols, do. of 6	2
Lettuces, do. of 3 varieties	2
Indian Corn, do. of 6	2
Peas, in pod, do. of 50	3
Pot Herbs, best assortment	3
Tomatoes, best plate of 12	2
Potatoes, not less than 12	4
Turnips, do. 12	3
Best Dalli of Vegetables	8

Vacancy on the Council. Owing to the vacancy caused by the resignation of Mr. J. W. Baker, the Council recommend the election of Mr. J. R. Bertram as a Member of Council. The election was duly confirmed.

Jersey Cabbage. Read following letter from Sir Charles Stevens, K. C. S. I., forwarding a packet of above. "With "this I am sending you a packet of the cabbage seed peculiar "to this island. The plant has a long stem and under favour- "able circumstances grows 10 feet or more high. The leaves "are stripped one by one from the stem, as they become "large enough to be of use. The stems become woody, and "are eventually used for making walking sticks; these are "very tough and light. The leaves here, I believe, are chiefly "used for feeding cattle. The seeds will be sown and the "plants treated like the ordinary cabbages. I am under the "impression that they do not attain their height in the first "season but go on growing. This in the plains of Bengal, "would not be possible. Perhaps this vegetable may be "more curious than useful to you, but it is at any rate, inter- "esting."

Biskutli. Read letter from Mr. J. H. E. Garrett, C. S., forwarding specimens of this plant and enquiring its botanical name. The plants have been potted up and when available, full specimens will be sent to the Superintendent, Royal Botanic Garden to be named. The plant appears to be a species of Polygonum. Mr. Garrett states that he has rid his lawn of earth-worms by using a decoction of the leaves of this plant.

The proposed experimental cultivation of Tea. Read following letter from Messrs. Begg, Dunlop & Co :—"In res- "ponse to your request we have now the pleasure to hand "you 6 small packets of different varieties of Tea seed from

" the Amgoorie Tea Estate, Assam, which we trust will be " found in good condition. We have written to several of " our other gardens in different districts to send a similar " contribution and these will be handed to you when they " come to hand."

The varieties received were (1) Naga, (2) Naga hybrid, (3) Indigenous, (4) Hybrid, (5) Munipur, (6) China.

Sphagnum species. A small box containing a sample of *Sphagnum* was forwarded by Mr. A. C. Hartless, Superintendent, Lloyd Botanic Garden, Darjiling, who found it growing on rocks on Tongloo. The moss is now recovering fast and appears to be the true *Sphagnum*. Mr. Hartless states that he has used it on the small collection of orchids in the Lloyd Botanic Garden and has already noticed an improvement in the plants. A sample was sent to Mr. W. Gollan, Superintendent, Government Botanic Garden, N. W. P., Saharanpore, who states that the moss is a true *Sphagnum* and corresponds to a specimen discovered lately in the Chamba State, which Dr. Brotherns identified as *Sphagnum fimbriatum*. Hook f.

If it is possible to acclimatise this moss on the plains, a great stride will have been made towards the success of Orchid culture in Calcutta and elsewhere.

Mr. Hartless states that he has asked the Forest Department to estimate the cost at which it can be sold.

Paspalum dilatatum. Messrs. Law, Somner & Co., Swanston St. Melbourne. Victoria, are now in a position to supply seeds of this fodder grass at five-shillings and six-pence per pound. Their experience of the grass is given in the following communication:—"There can be no question as to *Paspalum dilatatum* being an invaluable grass, and it is now being eagerly sought for, since it has passed the stage of experiment.

It resists both heat and cold (withstands drought, and frosts will not kill it), yields enormous quantities of fodder, is much liked by stock, and is shown by analysis to be of excellent quality. A good many people have found a difficulty in getting the seed to germinate. In our opinion this has been due to their sowing at the wrong time of the year, and in some cases where very unfavourable seasons, droughts &c., have occurred after sowing. Never sow in the fall of the year, but choose the early spring and summer, just before the ordinary season's rains may be expected. The quantity of seed to sow per acre varies with the requirements; 5lbs. to 8lbs. per acre on well prepared ground will soon result in a good paddock. If 1½lbs. to 2lbs. per acre are sown, after grazing, it should be held up about September, and allowed to grow on and shed all its seed naturally. It will soon spring up, and young grass, if anything like a favourable season takes place, will be fit to graze in May. We consider that allowing the grass to shed its seed is the very best and surest method of thoroughly establishing a pasture. When the plants are far apart the grass grows into big tussocks, but as soon as the spaces are filled up it forms quite as good a turf as any of the other grasses. There is nothing hard or wiry about this grass, it is soft and succulent, and there is no part of it from the crown to the seed-heads that the stock will not eat."

Irrigation. Mr. Burnet Landreth, Bristol, Pennsylvania, forwards the following copy of a letter addressed by him to the United States, Secretary of Agriculture on the subject of irrgation:—

IRRIGATION FOR THE EAST.

Hon. James Wilson, Secretary of Agriculture—On the 9th of June, 1896, I wrote the department suggesting the

practicability, unquestionable advantages and popularity of a movement on the part of the United States Department of Agriculture to establish a thoroughly illustrative and fully-powered system for lifting water, storing and distributing it, for the irrigation of river farms, where the water cannot be dammed and is below the level of the land to be irrigated.

I was then informed that congress had failed to continue an appropriation for irrigation experiments and investigations for the fiscal year ending June, 1897, but that is no reason why another attempt should not be made before this next congress in 1900, and it seems to me the cheapest and most practical course is to establish an experiment station where all systems, methods and appliances can be assembled for the practical instruction of observers.

Such an illustrative plant could be established on the banks of the Potomac, either above or below Washington, with the object of showing the planters and farmers of the East, South, middle West and all other flat sections, how, at least, the front portions of their river farms could be preserved against the blighting effects of our annual midsummer drouths. Every thoughtful man in the East is astounded at the slight progress made in the old states in meeting the damaging conditions of summer drouths, which seem to be increasing in intensity and frequency, while untold millions of tons of water rush past fields bearing blighted crops, just because the methods and practicability of elevating and distributing such water have not been demonstrated.

In the far West it is different—there the waters of mountain streams have in many cases been entirely devoted to irrigation; but few such elevated sources of water and such opportunities exist in the agricultural sections of the

East and South. There the waters are below the farm levels. Irrigating waters in the western states are sometimes obtained at very little expense, but at other times at a vast outlay of engineering skill and money, as for example, according to Report No. 33 of the Geological Survey, the Department of the Interior expended in 1875, $3500 for preliminary surveys by their hydrographer, A. P. Davis, as to the feasibility of damming the Gila River, which runs into the Gulf of Mexico, the inhabitants being exclusively 7000 half-breed Indians. There it was estimated each Indian required $1\frac{1}{2}$ acres of irrigated land for actual support, but in view of future increase in population, 40,000 acres were considered necessary to provide with water, and with that aim in view, Mr. Newell, the hydrographer in charge of the final surveys, recommended the expenditure of $10,000 damages for land taken, and an expenditure for construction of a dam of $2,643,000. Another water reserve is proposed, costing $1,989,000, and a third, over $1,000,000. All these being a small portion of the work proposed to be done by the government for a small desert section situated at the extreme southwest corner of the union, a district almost unknown and of exceedingly sparse population.

This is only one of the many operations of the same character undertaken or outlined by the Department of the Interior. Such has been the liberality of the government in damming mountain streams and storing water for western agriculturists, that it would seem within its province and within the expectation of eastern farmers, for the government to illustrate how to utilize river water passing the fronts of farms at ten to twenty feet below the surface of the land to be irrigated, and to show how each farmer, entirely independently of his neighbors, might establish his own irrigating plants, on his own river front, and water his fields for at least a mile

back from the banks, and on such areas as the contours or undulating surfaces would admit. In the East, it is seldom that over 10 or 20 acres of level surface and of the right decline or dip, can be found in any one field, but with a proper storage supply, different fields of the same farm could be treated as the conditions would dictate.

The government station I here propose should be fitted up with a full line of pumps of various mechanical designs, to suit all the conditions of lift; also with all designs of stand-pipes or elevated reservoirs, either on the immediate river bank or back in the fields; fitted also, with all practical forms of motors—steam, gas, oil, wind—for working the pumps, and in the fields various forms of reservoirs for storage, and all designs of flood-gates, main canals and branch-supply ditches, all of which apparatus would be lent by the manufacturers. The work at such a station would be the most popular ever instituted by the Department of Agriculture, as it would unquestionably at once be recognized as the most money-saving and the most money-making exhibition in the interest of the eastern farmer, and none so depressed as he, none needing so much some encouraging as to the future.

No doubt the example would be followed by state agricultural stations, as it would at once be recognized as the most important work to which their attention could be turned, for what value are the seeds, either good or bad, fertilizers, either good or bad, or the highest agricultural talent, if all efforts are defeated summer after summer, through want of rain. It would entirely eclipse in importance any single agricultural or horticultural interest, as it would at once comprehend all such interests.

Farmers could adopt their own methods of reaching the same results, at a very small cost, certainly not over $1,000

for a plant in all its details, capable of irrigating 20 or 30 acres, three times a week, the interest on such an expenditure at 10 per cent. being but $5 per acre annually, on a tract of 20 acres, while the irrigated crops would be quadrupled and made absolutely secure. An expenditure far more effective and less than half as expensive as the annual application of commercial fertilizers.

If the government should establish such a station, thoroughly illustrative of every mechanical appliance suited to all conditions, there might be necessary an appropriation of $20,000 to $25,000, but that would be a mere bagatelle compared with the natural agricultural development which such a station would accomplish. It would be a new departure, so novel and so eminently practical as to win the support of every one interested in agricultural developments. The irrigated fields of the station could be used for the experimental gardens of the department.

Will you consider this proposition?

Hedychium Elwesii. Mr. H. J. Elwes, F. R. H. S., Colesborne, Gloucestershire sends the following letter. "I am informed that you have a plant which I cannot get hold of, *Hedychium Elwesii*, which I discovered with Mr. C. B. Clarke in 1886, close by Bishop's Falls at Shillong. It is a crimson flower as big as that of *H. Gardnerianum* and the finest of the genus by far. What has been sent under the name is only a form of *H. coccineum*, very inferior. If you have not got it and could get any one at Shillong to send it, I should be much obliged and will pay all expenses, or send you orchids in return, and will divide the plants with Kew, Glasnevin and Edinburgh.—" According to Hooker's Flora of British India *H. Elwesii* is described as having bright yellow flowers with bright red filaments; the description is by Mr. Baker who

states: "May be an extreme form of *H. coronarium*." A reference was made to Major D. Prain, I. M. S., Superintendent of the Royal Botanical Garden, Calcutta, on the matter and he has replied as follows. "I have looked into the matter since I got back. We have no specimen of *Hedychium Elwesii* at all in the Herbarium. It is just possible that the plant described by Mr. Baker is the real plant to which Captain Elwes refers and that the colour is wrongly given from a dried specimen. If that is the case it is not at all impossible that my Naga Hill plant is the same thing, for it is very like *H. coronarium*, except that its flowers were scarlet and not yellowish-white. The bracts are very like, the leaves are, however, shorter for their width than in *H. coronarium*. The only other time that I have seen this plant was in 1887, or thereabouts when your predecessor, Mr. Blechynden, sent a specimen to be named of the very plant I had already got nearer Kohima. Mr. Blechynden's specimen consisted only of a flower and he was not able to permit us to keep it, so that it is not in the Herbarium to refer to now. Probably his correspondent wished it sent back. The flower was very like the flower of *H. coronarium*, I recollect, but it was quite scarlet. I wish I could tell you the year when our correspondence took place as you could then refer to my letter and to his correspondent. When I say it was from some one living near the Barak river that he got the flower, I speak only from recollection, but I think I am right all the same, for I was much impressed by the same plant that I had got, turning up again. My specimens are from two different parts of the same hill "Palinabadza" better known to the European residents as "Polly Badgley," near Kohima. One of the places is a narrow valley in the forest above Jotsoma on the north side of the hill, the other a similar valley on the east side of the hill. Both

places are some 1500-2000 feet above the highest level for *Hedychium coronarium*. However, the fact that you have a plant from Bishop's Falls which suits Mr. Baker's description of *H. Elwesii* is against Mr. Baker having mistaken the colour of the flower of the plant he describes.* And certainly Mr. Mann who knew the Khasia Hill *Hedychiums* so thoroughly, never sent us, and apparently never got, this scarlet flowered one with flowers as large as *H. coronarium*. Probably, therefore, you will not make anything of a reference to any Khasia correspondent. Better try any one you know in Cachar, or in Manipur, or at Kohima."

A reference to the records of the Society from 1886 to 1889 does not reveal any correspondence on the subject of the large scarlet flowered *Hedychium* referred to, but members and correspondents residing in the districts mentioned will be addressed with reference thereto. From letters received from members in Assam and Cachar and also in the Duars, and in conversation with them, it would appear, from the descriptions they have given of the family, that *Hedychiums* do not seem to be fully known to either the Kew or Calcutta herbariums, owing no doubt to the fact that few people take the trouble to forward plants and flowers for identification.

According to many persons the Lushai Hills, the valley of the Barak River and right through the Naga, Jaintia, Khasi and Garo Hills, the borders of Bhotan and Nepal, teem, with endless species and varieties of *Hedychium*, the majority of which produce desirable flowers and are likely to thrive on the plains.

* The specimen referred to in the Society's possession was received from Shillong and was said to have been gathered at Bishop's Falls under the name *H. Elwesii* but the colour is decidedly sulphur. The plant blooms regularly, but the bracts and leaves differ greatly from those of *H. coronarium*, the flower also is different in shape.

Garden Notes.

Aglaonema (*Aroideæ*) These dwarf, ornamental-leaved plants appear to have lost favour in the eyes of lovers of plants during the past few years, but all are well worth growing for their variegated leaves. The popular name for these plants, *Poison-dart* has been given on account of the poisonous property contained in them. *Vilaiti kachu* is said to be the vernacular name, but many other plants, such as Alocasias, are also known by this name. The generic name is derived from *aglaos*, beautiful, and *nemos*, a grove. Natives of Malaysia. Propagated by cuttings.

Allamanda (*Apocynaceæ*) A genus of free-flowering handsome creeping shrubs natives of Brazil and the northern part of South America. The three following are well worth growing. *A. purpurea*, of a distinct shrubby growth producing *Canterbury-bell-like* pale purple flowers. *A. Schottii*, a robust creeper bearing large golden yellow flowers, and *A. Williamsii*, which appears to do better as a sprawling shrub on the lawn, but if the straggling stems are pegged into shape, the whole forms a most effect object in the rainy months when its golden-yellow, scented flowers cover the plant. Propagated by layers. Named in memory of Dr. F. Allamand of Leyden.

Alocasia (*Aroideæ*) Tropical plants of great merit often producing large handsome leaves, more or less shield-shaped and chiefly natives of the hot moist parts of south-eastern Asia. Nearly all require rich fibrous soil and abundance of water when growing, but unlike Caladiums they do not generally shed their leaves when at rest. The pots require ample drainage with crocks and the roots, from the division of which they are propagated, should be allowed rest from November to March.

antiquorum. The commenest species in India with large metallic green leaves.

bataviensis. A large ornamental kind, producing in the rains huge, dark-green leaves with a chocolate coloured stem and ribs.

Boryana. This has very little interest except for its mottled stem.

Chantrieri. Highly ornamental species with whitish ribs.

gigantea. This is a very tall growing plant, specimens when fully grown measuring 20 to 30 feet in height, the petioles are very long and bear some what moderate-sized leaves with deep lobes and whitish ribs. The stem of a full-grown plant resembles that of the Traveller's Palm. This species is variously known as *A. amabilis* and *Schizocasia Portei.*

indica. The *Mancachu*, or *Mankanda* of the bazar, the sort which is often exposed for sale in markets. Scarcely of interest in an ordinary garden.

intermedia. An ordinary looking arrow-head leafed plant well mottled on its stems.

Jenningsii. A very ornamental leaved species rarely over a foot in height, its small leaves bearing broad dark brown blotches.

Johnstonei. A most interesting plant, producing large arrow-head-shaped leaves, green, with rosy-pink veins, the leaf stalks are at intervals covered with spines and are also mottled with pink. This plant requires to be grown well supplied with water.

Lowii. A highly ornamental species with a heart-shaped leaf, deep-green with ivory ribs and metallic purple underneath.

macrorhiza variegata. Leaves very large, green, mottled, blotched and splashed with cream and grey, some of the leaves are at times entirely ivory or cream coloured.

Marshallii. An ordinary plant with moderate sized leaves, blotched deep brown.

marmorata. Somewhat similar to the above but of a slighter build and occasionally blotched silvery-grey.

metallica. A dwarf plant with round heart-shaped leaves of a bronzy green above and metallic purple below, also known as *A. cuprea* and *Xanthosma plumbea.*

neo-guineensis. A pretty plant producing light green leaves blotched with grey and silvery marks, often called *Colocasia neo-guineensis.*

odorata. A some what stiff growing plant with green leaves. The flowers, which are of a deep buff colour, emit a scent when full grown.

Putzei. A very ornamental species somewhat similar to *A. Lowii.*

reginæ. A dwarf stiff growing plant with largish leaves of a greyish green colour.

Sanderiana. A handsome kind, young leaves bright glossy green, when older assuming a bluish-metallic reflection. The leaf is strongly lobed, the ribs and veins as well as the edges are ivory white.

S. superba Remarkably handsome, being less lobed then the foregoing with similar markings.

alocasia Sedeni. Said to be a hybrid between *A. Lowii* and *A. metallica*, leaves heart shaped, bronzy green, with ivory veins, purple underneath.

Veitchii. A tall erect growing species with sharp arrow-headed leaves, pale green with whitish ribs.

versicolor. A very tall erect growing species with large dull green leaves often blotched with grey and cream.

violacea. A tall growing plant with metallic purple leaves and bright deep claret coloured stems. Known also as *Caladium metallicum.*

zebrina. A fairly tall growing species with broad arrow-head shaped leaves, rich green, the petioles are pale green, mottled and striped with zigzag bands of dark green.

Aloe (*Liliaceæ*). The *Indian Aloe* is known in the vernacular as *Mushabbra.*

barbatus. This plant is somewhat common ; the edges of the leaves have thorns at regular intervals, while the leaves, which are thick, soft, fleshy and of a pale-green colour are spotted with white, the flower spikes are tall and bear dull red flowers. This plant does well on an open rockery. The specific name is derived from the Arabic.

Aloysia (*Verbenaceæ*). *The Lemon-scented Verbena* or *Kushboe Verbena.*

citriodora. This well known plant which is said to be a native of Chili does not thrive well in Calcutta, where it is propagated from cuttings and layers. The specific name was given in honour of Maria Louisa, the mother of Ferdinand VII of Spain, and was discovered in 1780.

Alpinia (*Zingiberaceæ*) *Shell-flowers.* Plants with ginger-like roots with the habit of the Canna. Known in the vernacular as *Taro.*

Alpinia Allughas. A common species luxuriating in moist spots ; flowers, in the rains, rather large of a rose colour.

nutans. A fine species with large flowers in drooping racemes, pearly white, the edges pinky-purple with bright orange in the interior. Called *Punag-champa* by malis.

cittata. A very useful dwarf plant producing leaves striped with white bands. The specific name is given in honour of Alpinius the Italian botanist. The roots when very young and tender are cooked as a substitute for *Chow-chow.*

Alstonia (*Apocynaceæ*) Tall trees, bearing at the end of the rains pale yellowish-white flowers, which emit at dusk a strong cardamom like scent.

macrophylla. The Devil's Tree or *Bara-chhatim.* A somewhat smaller species, *scholaris*, the *Chhatim*, is also plentiful. Both are loaded with flowers in the season. Propagated from seed.

Alternanthera (*Amarantaceæ*).—Dwarf shrubby plants known as *Joy-weeds* said to be called by malis *Lal-sag* and *Lal-sanche*, but they appear to prefer the botanical name. Little plants with coloured leaves used as borders and edging to beds. Increased by cuttings.

Amaryllis (*Amaryllideæ*).—The *Daffodil Lily* or *Vilaiti sukhdarsan.* These handsome flowering bulbs are now fast gaining popularity in India, though the majority are true *Hippeastrums* or *Knights' Star Lily*, but to all intents and purposes, so far as the amateur is concerned, they are taken

to be one and the same. Some of the flowers are of the richest crimson and blood-red, while others are nearly white, some striped, mottled or variegated in an endless and effective manner. Distinct species and hybrids have been intercrossed to such an extent, that breadth of petal, size, substance, form and colour of flowers have passed far beyond the most sanguine expectations of hybridisirs themselves.

When once established and of sufficient size, bulbs may be depended on to flower each year ; but a seedling requires from three to five years goods steady growth before it attains its flowering period.

The bulbs do not require much space, indeed when grown in pots they do better when the roots become pot-bound. Propagation is effected by seeds or offsets produced round the mother bulbs, some species and varieties are more prolific in this matter than others. Named sorts are, of course, best perpetuated by offsets.

Seeds should be sown *as soon as ripe* in light soil ; when large enough to handle, say after the second year, the little bulbs may be planted in good soil in three inch pots. Offsets, as already stated, are produced more readily on some species and varieties than others. When old enough these may be taken off the parent bulb, but the operation should be done carefully with the least possible injury to the roots and base of bulb, and when the plants are at rest, say in the month of December. When taken off, the offsets should be laid aside a day or two in a dry shady place to allow the part cut off the mother-plant to heal. Then plant in good rich dry soil.

Cultivation of the *Amaryllis or Hippeastrum* is very simple, but the rules should be strictly adhered to in order that

success may attend ones care. No water should be given to the plants after the rains, the bulbs being allowed to get all the rest they can. If any are required for early flowering, a few pots may be taken in hand about Christmas, the surface soil to the depth of an inch or two should be cleaned out, without disturbing the roots, and good rich soil filled in, water may then be given and as the flower stalks appear liquid manure should take the place of water until the buds commence to burst, when water must be given liberally until the rains.

The natural growing season is from early spring, say about middle or beginning of February, and the plants should then be treated as above.

When planting, the bulbs should be kept two-thirds above the soil, the roots spread out evenly and the soil pressed in tightly.

The great secret in growing the *Amaryllid* family appears to lie in the following details. (1) Never plant the bulb less than half its length in the soil. (2) Pots large enough to contain the roots with very little over should be used, for they never flower better than when root bound. (3) Use good rich soil, ramming it tight about bulbs and roots. (4) Plenty of drainage. (5) Water liberally in the growing season and when in bud with liquid manure. (6) Give them all the rest possible by witholding water after the rains, and put the pots in the full sun to ripen the bulbs.

There are a large number of species of the *Hippeastrum*, but the number of hybrids is endless, some in the Society's collection costing as much as five guineas each, while others are priced at ten to seventy-five rupees. These, it is needless to say, are few in number at present, and are used for the purpose of hybridizing.

A large number of hybrids are raised each year, but unfortunately cannot be catalogued for four or five years until they flower and show their characteristics.

Amaryllis or *Hippeastrums* do well on the plains of India and it is hoped that each year a larger number of desirable hybrids will be available.

The *Amaryllis* is named in honour of an ancient Greek lady of that name; *Hippeastrum* is derived from *hippeus*, a knight, and *astron*, a star, in allusion to the form of the flower more especially that of *H. equestre*

Amherstia (*Leguminosæ*) *Lady Amherst's Pea.*

nobilis, A highly ornamental tree growing to a height of 25 to 30 feet with exceedingly pleasing drooping foliage, composed of six to seven pairs of lance-shaped pointed leaflets, about seven inches in length. When the young pendulous, closely overlapping rich pinky tinted leaves are produced, the beauty of the tree is greatly enhanced. But when the large drooping vermillion flowers edged with burnished gold appear from the end of November to April, few trees can vie with it in elegance and loveliness.

Propagated either from seed which is seldom produced here, or by layers which are here put down in April, the young plants being cut off in fifteen months, in this manner a fair number of young plants may be counted on, little or no success has, however, been experienced with layers if put down in the hot weather and cut in the rains a few months later. During the fifteen months the layers are down water should always he given whenever the weather is dry. The Amherstia does not appear to succeed very far north, or west of Calcutta.

Named in honour of Lady Amherst an enthusiastic patron of Botany. A native of the valley of the Irrawady and Martaban.

Amoora (*Meliaceæ*) *The Tiktaraj.*

Rohituka. A large spreading jungle tree with handsome dark green foliage, suitable for very large gardens or parks Propagated from seed.

Amomum (*Scitamineæ*) *Jungli ilachi*, or *Jungli cardamom.* A dwarf stemless plant bearing sulphur-yellow flowers tinged with purple, suited for wild gardens. Increased by division of the roots.

Amorphophallus (*Aroideæ*) *Ole. Zaminkund The Devil's Spittoon.* A very remarkable and interesting genus members of the *Arum* family.

campanulatus. The species most generally met with is the one now mentioned, known as *Ole* in Bengal, *Zaminkund* or *Zimikund* in the North West, Punjab and neighbouring provinces, and as *Suran* in South India. Bulbs of this interesting *Aroid* may generally be purchased in the winter months in any large bazaar, good sound corms free from cuts or rot should be selected and put into the ground at once. These may be left there, or lifted in March and planted in large pots, or tubs, or in ferneries. Growth will start about the end of May in the shape of a pointed stem, by degrees the enveloping sheaths will give way and a stem push forth surmounted by a leafy growth. When the rains have fully broken the stems will lengthen and thicken and the leaf develope assuming the shape of an umbrella. The stem of a large bulb often grows to a height of five feet and bears leaves six feet in diameter, of a pale green colour, the stems being the same but mottled with creamy blotches. The large bulbs, however, generally throw up their flowers first, these are bell or spittoon shaped, brown, red and black in colour, often two to 2½ feet high and two

feet across. When fully expanded the flowers emit a most intolerable smell "likened to that which all the fish condemned at Billingsgate on a summer day raise at noon on the morrow." Residents in India, however, concur in the opinion that the stench is equal to that produced by the largest animal rotting they know of. In some parts of India and especially in Oudh this plant is cultivated for its roots, which are roasted and eaten as a substitute for *yams*. Propagatin is effected by small offsets found on the larger bulbs.

Firminger, strange to say, omits this common but beautiful species, aud names four others found in Malaysia.

bulbifer.—A slim growing species with a slender stem dark green, with chocolate blotches, the leaves smaller and more elegantly divided, bearing bulbs on the ribs.

rex.—A much larger species than *A. campanulatus*, from the Nicobars and Andaman islands.

The four kinds mentioned in Firminger are *A Kingii*, *A. Lacourii*, *A. Rivierii*, and *A. Titanum* all exotics, which appear to suffer greatly in the cold weather even in Calcutta.

Anacardium (*Anacardiaceæ*).—The *Caju*, *Hijli-badam*, or *Cashew Nut*.

Occidentale, a large forest tree said to be a native both of the East and West Indies. The flowers are small and are produced in panicles, of a rose-colour and fragrant. This fruit, to be had in most of the larger bazars, is of the shape and size of a small kidney and is to be found at the end of a pear-shaped peduncle. The shell of the fruit is very thick, hard and polished, between it and the kernel is is to be found an acrid brown oil, difficult to remove and imparting, even when roasted, a disagreeably pungent flavour to the fruit. In its uncooked state it is impossible to taste the

fruit without feeling very unpleasant sensations in the mouth for days. Nicholson suggests that the generic name is derived from *ana* like, and *kardia* a heart, in allusion to the shape of the fruit, the specific name relates to the fact that the tree is found in the West. Tbe seed should be sown when ripe.

Andropogon (*Gramineœ*) *The Lemon Grass. Agya-ghas* or *Rusa-ghas.*

Schœnanthus.—This well known grass is frequently met with in the majority of gardens and is cultivated for the fragrance of its leaves, which are used in flavouring custard. Propagated by division of the clumps.

Angelonia (*Scrophularineœ*) *salicariae folia.* An uninteresting plant with small blue gaping flowers produced at all times of the year. Propagated from cuttings or division of roots. The generic name is derived from *angelon* the name of the plant in South America, the specific name is given on account of the willow-like foliage.

Anthericum (*Liliaceœ*) *The Spider-wort.* From *anthos* a flower and *kerkon* a hedge.

variegatum.—A native of South America, a dwarf plant with keeled leaves, green, variegated with creamy stripes ; flowers small, white, borne on a rather tall spike. Propagated by division, a useful plant for rockeries.

Anthocephalus (*Rubiaceœ*) *Cadamba. The Kadam.*—A very common, large, quick-growing tree with broad leaves often a foot in length. Flowers about the size of a tennis-ball but spiky, yellow with whitish spikes, scented, produced in abundance during the rains. Propagated from seeds.

AGRICULTURAL AND HORTICULTURAL SOCIETY OF INDIA.

The Ordinary Monthly Meeting was held at the Metcalfe Hall, on Wednesday, the 12th December at 4 p m.

Present:

MR. H. C. EGGAR, *President, in the Chair.*

MAJOR D. PRAIN. I. M. S.
MR. F. G. CLARKE.
RAJA PEARY MOHUN MUKERJEE. C S.I.
RAI PROSONO COOMOR BANERJEE. BAHADUR.

MR. P. LANCASTER, *Secretary.*

The following gentleman was proposed and elected an ordinary Member.

Mr. H. Holmwood. I.C.S., Gaya, proposed by Mr. H. W., Stevens, seconded by Mr. H. C. Eggar.

CONTRIBUTIONS.

The Chemist and Druggist, Vol. LVII, Nos. 1084 to 1087 for November 1900. From the Editor.

The American Florist, Vol. XVI, Nos. 646 to 649, for October and November 1900. From the Editor.

The Planter, Vol. IX, New Series, Nos. 20 to 23, for November and December 1900. From the Editor.

Indian Gardening, Vol. VII, No. 19 to 23, for 8th November and 6th December 1900. From the Editor.

The Sugarcane, Vol. II, No. 23 for November 1900. From the Editor.

Indian Sportsman, Vol. II, Nos. 49 to 52, for November and December 1900. From the Editor.

Bulletin, No. 13, 14, 15 and 19, U. S. Department of Agriculture, Washington, 4 Copies. From the Director.

The Agricultural Ledger, Nos. 14 to 17, and 18, 2 Copies each. From Government of India.

Notes on the Administration of the Registration Department in Bengal, for the year 1899-1900. From Government of Bengal.

The Perak Government Gazette, Vol. XIII, Nos. 35, 36 and 37. From Government of Perak.

Journal of the Asiatic Society of Bengal, Vol. LXIX, Part II, No. 2, 1900. From the Society.

The Mayflower for November 1900. From the Editor.

Bulletin, No. 40 and 41, Vol. II, of the Department of the Land Records and Agriculture, Madras, 2 Copies. From the Director.

The Indian Forester, Vol. XXVI, No. II, for November 1900. From the Editor.

Journal of the Asiatic Society of Bengal, Vol. LXIX, Part II, No. 3 of 1900. From the Society.

Gardening Circular, Vol. II, No. 5, for November 1900. From the Secretary.

Indian Museum Notes, Vol. V, No. 2. From Government of Bengal.

Report on the Department of Land Records and Agriculture, Burma, for the year 1899-1900. From the Director.

Bulletin of Miscellaneous Information and Appendix, No. 1. From Royal Gardens, Kew.

Report on the Nagpur Experimental Farm in the Central Provinces, for the year 1899-1900, ending 31st March. From the Superintendent.

Annual Report on Government Gardens and Parks in Mysore, for the year 1899-1900. From the Superintendent.

Report on the Management of the District Gardens in the Central Provinces, for the year 1899-1900. From the Commissioner of Settlement and Agriculture.

PRESENTATIONS.

The Superintendent Royal Botanic Garden, Calcutta.

Villebrunea integrifolia seeds.

Phœnix rupicola seeds.

Mr. G. Girard, Calcutta.

One lot of plants.

Mr. W. J. Ager, Singtom, Darjiling.

One box of Tea seed.

Messrs. Begg, Dunlop & Co., Calcutta.

One box of Tea seed.

The Director, Botanic Garden, British Guiana.

One packet of seeds.

Dr. F. Franeschi, Santa Barbara, California, U. S. A.

Three packets of seed.

Babu Joy Gobind Law. C. I. E. Calcutta.

One lot of plants.

Exchanges.—Plants and seeds have been exchanged with various persons in South America, California, New York, Germany, France, Natal, Ceylon, Victoria, Port Blair and others in this country since last meeting.

References.—Since last Meeting 217 references on Horticultural and 300 on Agricultural subjects have been received and 29 from various Government Offices. The following is

a list of items referred to, Acme Weed Killer, 7. Aërmotors, 10, Agricultural machinery 14, Agricultural publications 8, Agaves 14, Bone-meal 13, Bamboos 11, Capparis spinosa 2, Fruit trees 29, Fodders 15, Flax 4, Fibres 21, Fibre machines 5, Fences 4, Guinea grass 5, Horticultural implements 9, Horticultural publications 14, Indigo substitutes 4, Ichthemic Guano 28, Insecticides various 9, Lac 2, Niquas 10, Oilcakes 9, Paspalum dilatatum 44, Potash 3, Potatoes 6, Palms 28, Pumps 7, Ornamental plants 58, Opium 1, Oats 5, Rhea 13, Rubbers 21, Rice-huskers 5, Specifications of inventions 4, Silk 8, Sansevierias 17, Sunflower 17, Tea experiment 12, Timber trees 14, Weed-killers 8, Water-lifts various 5,

Thirty eight botanical specimens were received for identification.

Flower Show 1901.—The following gentlemen have offered prizes, as below, for competition at the next Flower Show:—The Hon'ble. Mr. J. Buckingham, C. I. E., Rs. 50, Babu Aukshoy Coomar Ghose Rs. 16. Babu Joy Gobind Law, C. I. E., Rs. 16. Mr. A. A. Apcar Rs. 32, Babu Lalit Mohun Sinha Ray a Rs. 16.

Rose Show.—It was announced by the President that the Council had decided to hold a Rose Show at the Gardens of the Society on Friday the 25th January 1901. The cultivation of Roses is now fast extending throughout the country and as the General Flower Show is held at least two weeks too late for the best Roses, it was suggested that a separate exhibition for this particular class of flowers could with advantage be held, without in the least affecting the one fixed for the 15th and 16th of February next. The Society has subscribed a sum of Rs. 250, and the following gentlemen have promised Rs. 25 each, viz. Mr. H. C. Eggar, Major D. Prain I.M.S., Raja PearyMohun Mukerjee C.S.I. Mr. F.

G. Clarke. Rai Prosono Coomar Banerjee Bahadur. The Secretary was directed to prepare a schedule of prizes.

Flax.—Read letter from the Director Department of Land Records and Agriculture, Assam, forwarding a sample of Flax grown in Assam for decortication and report as to quality of the fibre. The stems are too fine and dry to be worked by any decorticator, the usual method of rotting was resorted to for the purpose of separating the fibre from the stem. From tests applied to the fibre it would appear that the fibre produced is of good quality, but it is not possible to give a full report on the small quantity extracted.

Linseed Oil-cake.—Read letter from Mr. H. St. J. Jackson forwarding a maund of Linseed Oil-cake manufactured by the Gourepore Company Ld., requesting that the Society experiment with it in its gardens as a manure for flower, fruit, and other plants; and that a report be furnished in due course as to results obtained. Mr. Jackson considers this oil-cake a most valuable manure, especially for fruit trees. Linseed Oil-cake is daily fed to the garden bullocks and is each year used as a manure after being throughly rotted, for roses and other flowering plants to a small extent. Fruit trees are this winter being treated with Linseed, and other oil-cakes.

Paspalum dilatatum.—Read letter from Mr. G. A. Pogson, First Vice-Consul, Hamburg, asking to be supplied with a quantity of *Paspalum dilatatum* seed for experiment on the sand-banks of Heligoland. Sufficient seed for the purpose has been ordered from Messrs. Law, Somner & Co., Melbourne.

Dr. F. Franceschi, Santa Barbara, California wrote for particulars regarding this fodder grass which were supplied, and he was referred to Botanical Stations in Central America from whence it is probable he will be able to obtain a supply.

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His Honour Sir JOHN WOODBURN, K.C.S.I.,
Lieut.-Governor of Bengal.

———:o:———

List of Members.

* This mark denotes Members who are absent from India, and therefore non-contributors.

† This mark denotes Members who, though absent, are desirous of continuing their subscriptions.

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Curtis, G., Esq., Penang 1894

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Cotes, E. C., Esq., Calcutta 1896
Alcock, Major A., Calcutta 1896
Watt, Dr. G., C.I.E., Calcutta 1898

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Anand Rao Puar, H. H. the Maharaja of Dhar, Indore 1872
Bhopal, H. H. the Begum of 1870
Bhawani Sing, Lokendra Sri, K.C.S.I., H. H. the Maharaja of Duttea, Bandelkhand ... 1864
Bhim Shumsher Jang, Rana Bahadur, General-Commanding, Bisalnagar, Nepal.. ... 1895
Bir Sing Deo, Maharaja Bahadur of Samthar, Bandelkhand 1898
Bishop,* Major-General H. P., R.E., England ... 1883
Bishnath Sing, H. H. the Maharaja Bahadur of Chhatarpur, Bandelkhand 1875
Buller,* T. Pole, Esq., England 1867
Bun Behari Khapur, Raja Bahadur, Manager, Raj Burdwan 1894
Carew,* R. R., Esq., England 1878
Chhatrapati, C.S.I., H. H., Rao Bahadur, Alipura, Bandelkhand 1876
Dhoje Narsing, Rana Bahadur, General, Nepal.. 1884
Dinshaw Maneckjee Petit, Sir, Bombay ... 1889
Gopal Sing, Raja of Jabua, Indore... .. 1874
Hussain Ali Khan Bahadur, G.C.I.E., Amir-ul-Umra, Nawab Sir Syed, Murshidabad ... 1885

Admitted.

Mahadeo Pershad Choudhari, Nanpur, Tirhoot... 1888
Maharaja, H. H. the, of Jahore 1868
Maharaja, H. H. the, of Kholapur 1898
50 Mohendro Madho Sing, H. H. Maharaja Bahadur of Puna. Bandelkhand 1898
Mohendro Sawai, Sir Partap Sing, Bahadur, K.C.I.E., H. H. Saramadi Raja, Orcha, Terhi... 1876
Palmer, T. A. G., Esq., Dehra Dun, N.-W. P. 1867
Protab Udai Nath Shah Deo, Maharaja of Chota Nagpore, Ranchi 1886
Richards,* J., Esq., England 1880
55 Sipahdar-ul-mulk Mulkhan Singh Bahadur, H.H. the Maharaja, Charkhari, Bandelkhand... 1880
Venkatras Balasahib Ghorapade, the Raja, Mudhol 1888
Wigram,* P., Esq., England 1871

ORDINARY MEMBERS.

A

Abbott, H. E., Esq., Shahpur, Patory, Dulsing Serai 1874
Ahlad Kumari, Thakurani. Ghatwalin of Narainpur, c/o Dy. Comr. Sonthal Parghanas, Jamtara... 1899
60 Ahsunullah, Nawab Sir, Bahadur, K.C.I.E., Dacca 1897
Aldam, W. C., Esq., 10, Hare Street ... 1893
Allen, C. G. H., Esq., C.S., Calcutta ... 1893
Allen, R., Esq., Calcutta 1898
Ambler, C. T., Esq., Jamalpur 1883
65 Anderson, J. A., Esq., Ballygunge, Calcutta ... 1881
Anderson, T. S., Esq., Ballygunge, Calcutta ... 1887
Arbuthnot, J., Esq., 5, Alipur Road, Calcutta .. 1896
Armstrong, Col. J., I.M.S., Cawnpur ... 1898
Asad Reza, Raja, S., Zemindar, Purneah ... 1899
70 Ashutosh Nath Roy, Raja, Cossimbazar ... 1898
Ashutosh Pramanic, Esq., 86, Baranasi Ghose's Street, Calcutta 1892
Aukshoy Coomar Ghose, Esq., 3, Prosono Coomar Tagore's Street, Calcutta ... 1894

B

Baddeley, P., Col., R.A., Cawnpur ... 1887
Baghwant Rao Chobi, Etawah, N. W. P. ... 1898

B

Admitted.

75	Bhagwati Saran Sing, Babu, Chanteria, c/o Genl. Manager, Court of Wards' Estates in Sarun, Chupra	1899
	Bah Thaw, Akunwun, Myingyan, Burma ...	1898
	Baker, J. W., Esq., 5, Lyons Range ...	1893
	Baillie, D. C., Esq., C.S., Benares, N.-W. P. ...	1884
	Barker. P. W., Esq., Nischindpur Factory, Ramnagore, E. B. S. Ry.	1896
80	Bashford, T., Esq., E. I. R. House... ...	1897
	Beglar, J. D., Esq., Chogda	1889
	Beresford, W. M., Esq., 33, Theatre Road ...	1892
	Bertram, J. R., Esq., 101, Clive Street ...	1896
	Beverley,* H., Esq., C.S.	1889
85	Beezley,* J. L., Esq., ...	1889
	Behari Lal Pyne, Esq., Hastings Street ...	1876
	Behari Lal Set, Esq., 358, Upper Chitpore Road	1897
	Bhairon Singhji, Bahadur, Rao Raja, Jhodpur...	1898
	Black, G. M. C., Esq., Tilbhoom Tea Estate, Chandkhira, Silhet	1897
90	Black, J. R., 5-6, Hare Street	1894
	Bonnerjee, K. S., Esq., Barister-at-Law, 6 Park Street	1899
	Bosanquet, O. V., Esq., C.S., Political Agent, Bhopawar, Sirdarpur, Mhow, C.I. ..	1899
	Boswell, H. D., Esq , Etah Tea Estate, Kajaldhara, Silhet	1887
	Branson, W. V., Esq., "Ilehole," Chuckmaglar, Kadur District, Mysore	1899
95	Bremner, W. S., Esq., C.E., Bankipur ...	1893
	Bridgeman, F., Esq., Newra Indigo Concern, Gorakhpur	1894
	Brownrigg,* F. W., Esq., C.S.	1893
	Burnell, T. G., Esq., Oodaleah Tea Estate, Chittagong	1894
	Bruce, H. W., Esq., Kuttlaguri Tea Estate, Tezpur, Assam	1884
100	Buckingham, J., Esq., C.I.E., Amguri, Assam ...	1879
	Buckley, F., Esq., Chamong Tea Estate, Nagri Spur, Sonada, D. H. R.	1895

C

Admitted.

CARSHORE, W. B., Esq., Chucksikander Factory, Bidoopur, Hajipur 1875
Cassimjee Adamjee, Esq., 6 David Joseph's Lane 1899
Chairman, Municipality, Patna 1898
105 Chakravarti, B., Esq., Barrister-at-Law, 52, Lower Circular Road 1895
Chamberlain, F., Esq., 72 Tiljulla Road ... 1899
Chhatra Nath Chaudhuri, Babu, c/o Manager Maldwar Wards' Estate, Ramganj, Ranisankail P. O., Dinagepur 1899
Chaudhuri, A. Esq., Barrister-at-Law, Bar Library 1899
Clarke, F. G., Esq., 2, Store Road, Ballygunge 1897
110 Cock,* G. W. C., Esq. 1893
Collingridge, H., Esq., Doudpur Factory, Mozufferpur 1888
Commandant, Lower Chindwin Military Police Battalion, Monywa, Burma 1890
Commandant, Upper Chindwin Military Police Battalion, Kindat, Burma 1896
Cooke, A., Esq., Palandu, Ranchi 1892
115 Cowley, F. A. A., Esq., C.E., Buxar, E. I. Ry. ... 1896
Cox, Capt., M. T., 10, Mirzapur 2nd Lane ... 1887
Criper, W. R., Esq., F.C.S., A.R.S.M., Konnagore 1889
Cruickshank,* D., Esq. 1881
Cruickshank, W. D., Esq., Secretary, Bank of Bengal, *Vice-President* 1894
120 Cumming, C. P., Esq., Budla Beta Tea Estate, Doom-Dooma, Assam 1893
Cumming, J. Gordon, Esq., C.S., Comilla ... 1898
Cussoobhoy, D. M., Esq., 12 Collootolla ... 1899

D

DALGLEISH, E. W., Esq., Manager, Dulsing Serai Concern, Tirhoot 1873
Darley, W. K., Esq., Danguaghar Tea Estate, Jalpaiguri 1885
125 Davenport, J., Esq., 30, Dalhousie Square ... 1886
David,* N., Esq. 1893

D

Admitted.

Davis,* G. A., Esq. 1893
DeLord, J. H., Esq., Gya 1897
DeMello, C. H., Esq., C.S., Arrah 1892
De Rhé Philipe, G. W. V., Esq., Waltair, E. C. Ry. 1897
Delevingne, W. N., Esq., C.S. Puri ... 1896
Devendra Nath Sahi Deo, Thakur, Jeria, c/o Commissioner of Chota-Nagpur, Ranchi ... 1899
Diwan of Jhalawar State, the, Jhalrapatam, Jhalawar, Rajputana 1899
District Traffic Superintendent, B. B. & C. I. Ry., Cawnpur 1893
Duke, F. W., Esq., C.S., Howrah 1898
Dulcken, A. C., Esq., 7-2 Theatre Road .. 1894
Duli Chand, Esq., 142, Cotton Street ... 1893
Duncan, R., Esq , 6, Clive Row 1898
Dunne, A. M., Esq., Barrister-at-law, 32 Theatre Road 1892
Dyson, Major H. J., I.M.S., 42, Park Street ... 1896

E

Eggar, H. C., Esq., Solicitor, 1, Alipur Lane, *President* 1895
Executive Engineer, the, Naga Hills Division, Kohima, Assam 1899
Ellisham Ali Mahomed, Munshi, Aminabad, Lucknow 1896

F

Farquharson, J., Esq., Cooliekosi, Nelli, Gauhati, Assam 1893
Fitzgerald, G. R., Esq., Chubwa Tea Estate, Chubwa, Debrughar 1888
Flavell, R. E., Esq., Begum Serai, T. S. Ry. ... 1897
Forbes, A., Esq., C.S., Ranchi 1893
Forbes, A. W., Esq., Secunderabad, Deccan ... 1898
Forstmann, C., Esq., Darjeeling 1896
Foster, G., Esq., 14, Theatre Road ... 1891

F

Admitted.

Fox, W., Esq., Naga Dhuli Tea Estate, Jorehat, Assam 1888

G

Gaitskell, Mrs. M. P., Craigmore, Yercaud, Shevaroys, Madras 1896
Garrett, J. H. E., Esq., c.s., Krishnagar, Nuddea 1895
Garrison Quarter Master, the, Fort William .. 1899
155 Garth. G. L., Esq., Barrister-at-Law, Dacca ... 1899
Geidt, B. G., Esq., c.s., Comilla 1893
General Manager, R. Watson & Co., Ld., Shikarpur *viâ* Meherpur, E. B. S. Ry. 1893
Gibbon. W. F., Esq., Senior, Doolah Factory, Gorakhpur 1870
Gilman, E. P. R., Esq., Mandakatta Tea Estate, Mandakatta. Kamrup, Assam 1891
160 Girard, G., Esq., Guseri 1898
Girish Chandra Roy, Rai Bahadur, Rainagar, Silhet 1895
Glen, R., Esq., 13 Clive Street 1898
Goethals, P., His Grace the Most Rev. Dr., Archbishop of Calcutta, *Senior Vice-President* .. 1881
Golam Mohiudin Husain, Nawab, Syed. c/o Manager, Khagra Wards' Estate, Kishenganj, Purneah 1899
165 Goodwin. F., Esq., Ajmere 1899
Gopal Saran Narayan Sing, Maharaj Kumar, c/o Manager Tikari Raj, Gya 1899
Graham, W., Esq., Barrister-at-Law, 17, Garden Reach 1890
Grant, G. F., Dr., Motihari, Champaran ... 1894
Grant, P. W., Esq., Jailor, Central Prison, Jubbulpur 1899
170 Grant, W. Maling, Esq., Bhagalpur ... 1887
Gregory, G. M., Esq., Opium Department, Ghazipur 1897
Gresham, S. T., Esq., Rainey Park, Ballyganj ... 1899
Grffiths, O. B., Esq., 12, Theatre Road ... 1887
Grossmann, A., Esq., 2 Victoria Terrace ... 1899
175 Growse, E. F., Esq., c.s., Cuttack 1896
Gujpati-Rao, G. N., c.i.e., Sri Raja, Vizagapatam 1885

H

Admitted.

HAMILTON,* Col. H., I.M.S., Almora ... 1896
Hariram Goenka, Rai Bahadur, 31, Banstolah Street 1894
Harman, L. L, Esq., Moorla Factory, Segouli ... 1895
180 Harris, E. B., Esq., C.S., Comilla 1899
Hayes, G. S., Esq., Purneah 1884
Helps, W., Esq., Baintbarri Tea Estate, Dam-Dim, D. H. Ry. 1894
Henderson, T., Esq., Salona, Nowgong, Assam 1884
Henery, E., Esq., 12, Harrington Street ... 1891
185 Hildersley, Rev. A. H., Sanawar 1884
Hope-Johnstone, W., Esq., 175, Lower Circular Road 1898
Hurri Bullab Bose, Esq., Cuttack 1887
Hynes, Mrs. J. C., Moulmein 1889

I

INGLIS, T., Esq., C.S., Hooghly 1895
190 Ismail Khan Mahomed, Esq., 58, Old China Bazar Street 1895
Irvine, W. H., Esq., Ranchi 1885

J

JACKSON, H. St. J., Esq., 53, Elliott Road .. 1897
Jadu Nath Mukerji, Rai Bahadur, Hazaribagh... 1893
Jadu Nath Sen, Esq., 35, Shibnarain Dass' Lane 1895
195 James, S., Captain I.M.S., Cooch Bihar ... 1899
Jessop, C. T., Esq, Panbari Tea Estate, Gatoonga, Assam 1893
Johnstone, W. W., Esq., Mussoorie ... 1898
Jotindra Mohan Rai Choudhuri, Babu, Tepa, c/o The Collector of Rungpur 1899
Jotendro Mohun Tagore, Sir, the Hon'ble Maharaja Bahadur, K.C.S.I., The Prasad ... 1894
200 Joyti Prasad Gorgo, Raja, Moisadal ... 1888
Joy Gobind Law, Babu, C.I.E., 24, Sukea Street 1892

K

		Admitted.
	KADAR NATH GOENKA, Esq., 31, Banstollah Street	1895
	Kadir Dad Khan, C.I.E., Khan Bahadur, Khairpur-Mirs., Sind	1898
	Kailas Chandra Bose, Dr., Rai Bahadur, 76, Sukea Street	1893
205	Kamakhya Charn Chatterjee, Babu, c/o Manager Kanakshar Wards' Estate, Erikate, Madaripur	1899
	Kastura Kumari, Thakurani, Ghatwalin of Rohini, c/o General Manager Wards' Estates, Deoghar, Santhal Parghanas	1899
	Ker, A., Esq., 7, Hare Street	1893
	Kidston, J., Esq., 100, Clive Street ...	1895
	King, E. J., Esq., 7, Victoria Terrace, *Vice-President*	1889
210	King, H. F., Esq., 7, Victoria Terrace ...	1897
	Kisch,* H. M., Esq., C.S.	1876
	Knox, G., C.S., the Hon'ble, Allahabad ...	1891
	Krishna Pershad Narain Sing, Babu, Hurdi, c/o Manager Wards' Estates, Patna, Bankipur...	1899

L

	LAKSHMI NARAIN SHROFF, Esq., 69, Cross Street	1894
215	Lal Behari Sing, Nagakair, Manbhum ...	1899
	Lal Chandra Udai Nath Sahi Deo, Katimkela, c/o Commissioner of Chota Nagpur, Ranchi ...	1899
	Lal Harakh Nath Sahi, Deo, Utka, c/o Commissioner of Chota Nagpur, Ranchi ...	1899
	Lalita Mohan Singha Rai, Esq., Chakdighi ...	1893
	Lancaster, C. M., Esq., Calcutta	1899
220	Lancaster, P., Esq., M.R.A.S., F.R.H.S., *Secretary to the Society*	1887
	Lawrie, Mrs. E., Hyderabad, Deccan ...	1888
	Lawrie, H. J., Esq., Chotajan Tea Estate, Mohima, Assam	1893
	Light, L. A., Esq., C.E., Bilaspur, C. P. ...	1896
	Long, A. M., Esq. Raipur, C. P.	1893
225	Lowis, J. R., Esq., Bettiah	1897
	Lowrie, A. E., Esq., Chanda, C. P.	1893
	Lowry, W. A., Esq., Dantmara Tea Estate, Chittagong	1896
	Lyall, R. A., Esq., 25, Short Street ...	1875

M

Admitted.

	Macgregor, J. D., Esq., Arrowah Concern, Chupra	1884
230	Mackenzie, M. M., Esq., Rajaputtee Factory, Chupra	1894
	Mackinnon, F., Esq., Bubnowlie Concern, Tomkohi, Gorakhpur	1887
	Mackinnon, John, Esq., c/o Messrs. Macneill & Co., 2 Clive Ghât Street	1875
	Mackinnon, John, Esq., Maniarah Factory, Gopalganj, Saran	1895
	Mackinnon, V. A., Esq., Mussoorie ...	1887
235	Mackintosh, D. J., Esq., Koloni Tea Estate, Balipara, Tezpur, Assam	1893
	Mackintosh, G. B., Esq., 6 Elysium Row ...	1899
	MacLeod, E. G., Esq. Kotechandpur, Jessore ...	1895
	Macnamara, H. H., Esq., Musruck, Chupra ...	1898
	Macpherson, W. C., Esq., C.S., Chupra ...	1893
240	Maddox, S. L., Esq., C.S., Calcutta ...	1896
	Maharaja Bahadur of Bettiah, Bettiah ...	1876
	,, Bahadur of Bikanir, Bikanir, Rajputana	1895
	,, Bahadur of Darbhanga, Darbhanga ...	1897
	,, Bahadur of Gidhour, Monghyr ...	1892
245	,, Bahadur of Kuch Behar, Kuch Behar ...	1864
	,, Bahadur of Morbhanj, Balasore ...	1887
	,, Bahadur of Rewah, Sutna, E. I. Ry. ...	1877
	,, Bahadur of Sunbursa, Bhagalpur ...	1893
	MahomedAli Khan, Nawab, Malerkotla, Panjab...	1899
250	Mahomedbhoy Alibhoy, Esq., 16 Sukea Street ...	1899
	Mahomed Bukhtyar Shah, C.I.E., the Hon'ble, Prince, Tollyganj	1899
	Malcolm, J, G., Esq., Mira, Ramnagar, Nuddea...	1894
	Manager, Ackriganj Indigo Concern, Jeaganj ...	1893
	,, Adabari Divn., British Assam Tea Co., Ld., Adabari, Assam	1896
255	,, Adamtila Tea Estate, Patharkandy, Silhet	1896
	,, Amluckee Tea Estate, Nowgong, Assam	1889
	,, Amo Tea Estate, Machikandi, Cachar ...	1889
	,, Assam Frontier Tea Co., Ld., Lakhimpur, Assam	1887
	,, Atal Tea Estate, Naxalbari, Siliguri ...	1887

M

Admitted.

260 Manager, Badamtam Divn., Lebong Tea Co., Ld., Darjeeling 1893
,, Baghdogra Tea Estate, Baghdogra, Siliguri 1884
,, Baintguri Tea Estate, Dam-Dim, Jalpaiguri 1887
,, Balasun Division, Darjeeling Consolidated Tea Co., Ld., Darjeeling... ... 1875
,, Bally Paper Mills Co.. Ld., Bally ... 1885
265 ,, Bamgaon Tea Estate, Balipara, Assam... 1896
,, Baradighi Tea Co., Ld., Baradighi, Mal, Duars 1897
,, Barromassia Indigo Concern, Katlamari, Jeaganj 1893
,, Bengal Tea Co., Ld., Aenakhal, Monacherra, Cachar 1867
,, Bengal Timber Trading Co., Rourkela, B. N. Ry. 1893
270 ,, Bhramapootra Tea Co., Ld., Negheriting, Assam 1875
,, Bishnath Tea Co., Pertabghar Divn., Charalli, Assam 1875
,, Blackburn Tea Co., Debrughar, Assam 1893
,, Bogracote Tea Co., Ld., Pillan's Hât, Siliguri 1893
,, Bogree Indigo Concern, Garbetta, Midnapore... 1893
275 ,, Borelli Tea Co., Ld., Balipara, Assam 1873
,, Borjuli Tea Estate, Balipara, Assam ... 1890
,, Borooncherra Tea Estate, (Kookeecheera), Katlicheera, Cachar ... 1876
,, Borokai Tea Estate, Silchar, Cachar ... 1888
,, Bowreah Cotton Mills Co., Ld., 5, Mission Row 1883
280 ,, Bullabari Tea Estate, Dam-Dim, Siliguri 1873
,, Burhoga Indigo Factory, Jaun Bazar, Chupra 1884
,, Burramsal Tea Estate, Kajaldhara, Silhet 1893

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			Admitted.
	Manager,	Buxa-Duars Tea Co., Ld., Kalchini, Alipur, Duars	1896
	,,	Cantacobra Indigo Concern, Dumcole, Berhampur	1893
285	,,	Central Cachar Tea Co., Hailakandi, Cachar	1875
	,,	Central Terai Tea Co., Ld., Sukna ...	1875
	,,	Chalkoa Tea Estate, Debrughar, Assam	1898
	,,	Chargola Tea Association, Ld., Ratabari, Silhet	1889
	,,	Chengmari Tea Estate, Luksan Hât, Jalpaiguri	1893
290	,,	Chukia Factory, Mairwa, B.N.W.R. ...	1895
	,,	Chulsa Tea Co., Ld., Chulsa, Jalpaiguri	1887
	,,	Chumta Tea Association, Darjeeling ...	1875
	,,	Clevedon Tea Estate, Kulaura, Silhet...	1893
	,,	Cossipur Tea Estate, Silchar, Cachar .	1897
295	,,	Dahingeapore Tea Estate, Moriani, Assam	1865
	,,	Dakhinshahbazpur Wards' Estate, P.O. Dowlatkhan, Backerganj ...	1899
	,,	Daputa Tea Estate, Tezpur, Assam ...	1887
	,,	Dauracherra Coffee and Fibre Estate, Munshi Bazar, Silhet	1896
	,,	Debrughar Divn., Upper Assam Tea Co., Ld., Debrughar, Assam ...	1881
300	,,	Debrughar Combination Tea Co., Ld., Debrughar, Assam	1885
	,,	Dehing Tea Co , Ld., Khowang, Assam	1898
	,,	Dejoo Valley Tea Estate, Salona, Nowgong, Assam	1878
	,,	Dekorais Divn., Bishnath Tea Co., Ld., Bishnath, Assam ...	1896
	,,	Dessai and Parbuttia Tea Co., Ld., Moriani, Assam	1893
305	,,	Dheodam Tea Co., Ld., Bara Hapjan, Assam	1898
	,,	Dhulapadong Tea Estate, Empire of India Tea Co.. Ld., Borjuli, Assam...	1899
	,,	Digulturrung Tea Estate, c/o Messrs. Macneill & Co., 2 Clive Ghât Street	1899

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			Admitted
	Manager,	Dilkhush Tea Estate, Lukhipur, Cachar	1881
	,,	Dinjan Tea Estate, Debrughar, Assam	1886
310	,,	Doodputlee Tea Estate, Silchar Cachar	1893
	,,	Dooloo Tea Estate, Silchar, Cachar ...	1869
	,,	Dooria Tea Estate, Badlipar, Assam ...	1893
	,,	Dullabcherа Divn., Singla Tea Co., Ld., Dullabcherra, Silhet	1889
	,,	Dulsing Sarai Concern, Dulsing Sarai, Tirhut	1873
315	,,	Dumraon Raj Estate, Dumraon ...	1897
	,,	East India Tea Co., Ld., Jorehat, Assam	1865
	,,	East India Tea Co., Ld. (Cachar), Silchar, Cachar	1866
	,,	Equitable Coal Co., Ld., Bárakar ...	1891
	,,	Fort Gloster Jute Manufacturing Co., Ld., 5, Mission Row	1889
320	,,	Gellahatting Tea Co., Ld., Jamaguri Hât, Assam	1877
	,,	Geille Tea Co., Ld., Rungi Rungliot, Darjeeling...	1875
	,,	Goomrah Tea Estate, Western Cachar Tea Co., Ld., Atgram, Silhet ...	1865
	,,	Goomtie Tea Estate, Gumti, Darjeeling	1886
	,,	Gotoonga Tea Estate, Jorehat, Assam	1897
325	,,	Gouripore Co., Ld., Naihati ...	1864
	,,	Government Garden, Faizabad, Oudh	1871
	,,	Greenwood Tea Co., Ld., Debrughar, Assam	1875
	,,	Guseri Cotton Mills Co., Ld., Guseri, Calcutta	1884
	,,	Gyabari Divsion, Darjeeling Consolidated Tea Co., Ld., Panighatta, Kurseong	1887
330	,,	Haldibari Tea Association, Gairkhatta, Jalpaiguri	1890
	,,	Halmira Tea Estate, Golaghat, Assam	1870
	,,	Hantapara Tea Co., Ld., Madarihât, Jalpiguri	1890
	,,	Hapjan Tea Estate, Debrughar, Assam	1893
	,,	Hashmara Tea Co., Ld., Pani Basti, Buxa-Duars	1896
335	,,	Hathimara Tea Estate, Kalain, Cachar	1896

M

Admitted.

Manager, Haticherra Tea Estata, c/o Messrs. Macneill & Co., 1-2, Clive Ghât Street 1897
,, Hingajia Tea Co., Ld., Kajaldhara, Silhet 1889
,, Hulmari Tea Co., Ld., Hulmari, N. Lakhimpur, Assam ... 1875
,, Hunwal Tea Co., Moriani, Assam ... 1893
340 ,, Hutwah Raj, Hutwah, Sarun ... 1897
,, Imperial Paper Mills Co., Ld., Kanknarra 1893
,, Jafferbund Tea Estate, Lala, Cachar 1889
,, Jardine, Skinner & Co.'s, Messrs., Shellac Factory, Mirzapur ... 1893
,, Jetinga Valley Tea Co., Ld., Barkkhola, Cachar 1893
345 ,, Jhanzie Tea Association, Jorehât, Assam 1893
,, Jiaguri Tea Estate, Nowgong, Assam 1893
,, Jungle Mehal Indigo Concern, Midnapur 1893
,, Kajha Indigo Concern, Azimgarh ... 1880
,, Katline Tea Estate, Badarpur, Cachar 1874
350 ,, Kamarhati Co., Ld., 5, Clive Row . . 1887
,, Kanika Wards' Estate, Ganjam ... 1888
,, Kanknarra Co., Ld., Kanknarra ... 1887
,, Kassomari Tea Estate, Dehing Co., Ld., Debrughar, Assam ... 1875
,, Kellyden Division, Chubwa Tea Co., Ld., Meesa P. O., Assam ... 1882
355 ,, Khobong Tea Co., Ld., Talup, Assam 1884
,, Khonikor Tea Estate, Debrughar, Assam 1882
,, Kilcott Tea Co., Ld., Chulsa, Jalpaiguri 1883
,, Kinderpatti Indigo Concern, Kinderpatti *viâ* Gorakpur 1899
,, Kolassy Indigo Concern, Katihar, Purnea 1895
360 ,, Koyah Tea Estate, Hailakandi, Cachar 1895
,, Kuttal Tea Co., Ld., Silchar, Cachar 1890
,, Lalchund Tea Estate, Habigani, Silhet 1895

M

			Admitted.
	Manager,	Lallacherra Tea Estate, Second Mutual Tea Co., Ld., Badarpur, Cachar	1879
	,,	Lallamukh Tea Estate, New Mutual Tea Co., Ld., Badarpur, Cachar ...	1875
365	,,	Lankapara Tea Estate, Jalpaiguri ...	1898
	,,	Lohargar Tea Estate, Panighatta, Duars	1893
	,,	Luchimpur Wards' Estate, Bhagulpur	1899
	,,	Luckwah Tea Co., Ld., Nazira, Sibsagor, Assam	1875
	,,	Lydiacherra Tea Estate, Tarrapur Tea Co., Ld., Dewan, Cachar ...	1889
370	,,	Mahamara Tea Estate, Dipling, Sibsagor, Assam	1895
	,,	Majagram Tea Estate, c/o Messrs. Macneill & Co.	1898
	,,	Majulighar Tea Estate, Majuli Tea Co., Ld., Sutea, Bishnath, Assam	1875
	,,	Malighati Wards' Estate, Midnapur	1899
	,,	Margaret's Hope Tea Estate, Toong, D. H. Ry.	1876
375	,,	Massempur Tea Estate, New Mutual Tea Co.,Ld., Lala, Badarpur, Cachar	1876
	,,	Matelli Tea Co., Ld., Cachar and Duars Tea Co., Ld., Chulsa, Jalpaiguri ...	1887
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	,,	Moonee Tea Estate, Siliguri ...	1883
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390	,, Noakacharee Tea Co., Ld., Jorehat, Assam	1865
	,, Nonoi Division, Chubwah Tea Co., Ld., Salona, Assam	1882
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400	,, Punkhabari, Tea Co., Ld., Pankhabari, Darjeeling	1878
	,, Pussimbing Divn., British Darjeeling Tea Co., Ld., Ghoom, Darjeeling...	1896
	,, Rajapur Indigo Concern, Bilmariah, Sara, E. B. S. Ry.	1893
	,, Rajmai Tea Estate, Rajmai, Sibsagar, Assam	1881
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„ Turtipur Indigo Concern, Jungipur, Malda 1893
„ Zuranti Tea Estate, Mal, Jalpiguri ... 1887
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460 „ Piplagul Tea Estate, Chandkhira, Silhet 1898
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